BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF DELAWARE

IN THE MATTER OF THE APPLICATION OF DELMARVA POWER & LIGHT COMPANY FOR AN INCREASE IN ELECTRIC BASE RATES AND MISCELLANEOUS TARIFF CHANGES (FILED SEPTEMBER 18, 2009)	)	PSC DOCKET NO. 09-414
IN THE MATTER OF THE APPLICATION OF DELMARVA POWER & LIGHT COMPANY FORAPPROVAL OF A MODIFIED FIXED VARIABLE RATE DESIGN FOR ELECTRIC RATES (FILED JUNE 25, 2009)	)	PSC DOCKET NO. 09-276T

DIRECT TESTIMONY AND EXHIBITS OF
JAMES A. ROTHSCHILD

ON BEHALF OF THE STAFF OF THE
DELAWARE PUBLIC SERVICE COMMISSION

FEBRUARY 10, 2010

I. STATEMENT OF QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is James A. Rothschild and my address is 115 Scarlet Oak Drive, Wilton, CT 06897.

Q. WHAT IS YOUR OCCUPATION?

A. I am a financial consultant specializing in utility regulation. I have experience in the regulation of electric, gas, telephone, sewer, and gas utilities throughout the United States.

Q. FOR WHOM ARE YOU APPEARING IN THIS PROCEEDING?

A. I am appearing on behalf of the Staff of the Delaware Public Service Commission.

Q. PLEASE SUMMARIZE YOUR UTILITY REGULATORY EXPERIENCE.

A. I founded Rothschild Financial Consulting in 1985 and have been a consultant since 1972. From 1979 through January 1985, I was President of Georgetown Consulting Group, Inc. From 1976 to 1979, I was the President of J. Rothschild Associates. Both of these firms specialized in utility regulation. From 1972 through 1976, Touche Ross & Co., a major international accounting firm (which later became Deloitte Touche), employed me as a management consultant, where much of my consulting was in the area of utility regulation. I have worked for various state utility commissions, attorneys general and public advocates on matters relating to regulatory and financial issues and have filed approximately 350 testimonies relating to public

utility ratemaking in numerous jurisdictions in the United States and Canada addressing rate of return, financial issues, and accounting issues. (See Appendix A.)

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND?

A. I received an MBA in Banking and Finance from Case Western University (1971) and a BS in Chemical Engineering from the University of Pittsburgh (1967).

II. INTRODUCTION AND PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

We go about our daily lives hearing and reading about finance. Trying to understand the underlying cause of the stock price fluctuations on the CNBC crawler is a goal of investors. Academics interested in math and high- speed computers packed with data also contemplate the stock market. With so many skilled investors seeking a market advantage every day, stock prices adjust with each buzz of an I-Phone or Blackberry. Walmart's sales are higher than expected - tick. A rainstorm impacts the peanut crop in Brazil - tick. Federal Reserve Chairman Bernanke speaks – tick, tick, tick, tick... . Each news flash creates the next ebb and flow of risk and reward. When an investor purchases a stock, including utility stocks, what return is expected? How much risk uncertainty is associated with that projected outcome?

Scientists study the universe. I study financial markets as both an investor and an expert witness in utility rate proceedings. This testimony presents my perspective on what return investors expect on an investment in Delmarva and why my recommendations are proper.

I have been testifying on the cost of capital for over three decades. I have filed testimony in roughly 350 utility ratemaking proceedings, and prepared testimony for countless other cases that settled prior to filing. With few exceptions, my client was a utility commission or a state or other government utility consumer advocate group. I have consistently recognized that ratepayers are harmed if rates are too high or too low, and are best served in the long-run only when the cost of capital is correctly determined.

The cost of capital evaluation is an important part of the ratemaking process and can be fascinating. Stephan Hawking was told that for every equation he put in his books his sales would be halved. After careful consideration he included one equation $E = MC^2$. There is more than one equation in this testimony.

Most of the cost of capital debate in rate proceedings generally focuses on the computation of the cost of equity component, and how to compute the cost of equity is more controversial than appropriate. Part of the controversy is due to many cost of equity witnesses having a tendency to provide a strange mix of overly simplified methods and overly complex and invalid criticisms of the available methods that are appropriate to use to determine the cost of equity. This dual standard no doubt creates discomfort among those who have not dedicated themselves to learning the intricacies of the cost of capital determination process.

Over the time I have been testifying on the cost of capital, I have seen much misuse of cost of equity techniques. I intend to provide information in this testimony on the correct way to implement common cost of equity approaches. I will not only show how I have arrived at my cost of capital, but will also provide explanations of why my approaches are appropriate and how to implement them properly.

I recognize that readers of this testimony will have both considerably different levels of knowledge about the cost of capital and widely varying motivations and orientations. Providing enough information to allow those desiring a deeper understanding of an appropriate way to compute the cost of equity requires more length than some might wish. Therefore, the summaries included within the testimony are intended to allow those who only require an overview to obtain the information they need efficiently.

III. CONCLUSIONS

Q. PLEASE SUMMARIZE YOUR COST OF CAPITAL CONCLUSIONS IN THIS CASE.

A. Before considering the appropriate deduction to the cost of capital resulting from the revenue-decoupled rate design that Delmarva has proposed under Delaware law, the overall cost of capital to Delmarva is 7.18%. This is based upon a capital structure containing 47.52% common equity, and 52.48% long-term debt that was requested by the Company and using a 9.5% cost of equity which represents the rounded-up mid-point of a range of 9.15% to 9.70%.

The 9.15% lower end of the cost of equity range is oriented towards the 12/31/09 Discounted Cash Flow ("DCF") result of 9.55% and the 9.12% result of the Capital Asset Pricing Methods ("CAPM") methods, reduced by 0.15% to recognize the lower risk associated with Delmarva's higher common equity ratio compared to the comparative group of electric and gas companies used to compute the cost of equity. The 9.70% high end of the range gives primary emphasis to the DCF over the year ending 12/31/09, with that result also lowered by 0.15% because of capital structure considerations.

As discussed in detail later in this testimony, I implemented the DCF method by first computing the dividend yield. Then I determined growth in a way that is consistent with the dividend yield. This often overlooked procedure to provide consistency between the dividend yield and growth rate computations is vital to the integrity of the results obtained from the DCF method. Growth for a utility company is not an abstraction, but results directly from a company using the portion of earnings not paid out as a dividend to purchase productive assets that cause earnings to grow. This is why consistency with the way the dividend rate is obtained and growth is computed is an important part of properly applying the DCF method. While accounting for this interrelationship between earnings and dividends requires a simple mathematical step (explained later in this testimony), failing to correct for this can easily result in a mathematically invalid growth rate conclusion. The DCF method currently indicates a 9.55% cost of equity for the comparative group of electric and gas companies as of 12/31/09, down from 9.86% based on stock prices averaged for the entire year of 2009. Both of these results need to be lowered by 0.15% to be applicable to Delmarva's capital structure that contains a relatively high level of common equity and therefore is less risky than the comparable group.

The net result of examining three different approaches to the CAPM method (the traditional CAPM, a market-based CAPM, and the specific result obtained in the *Ibbotson SBBI 2009 Classic Yearbook* (hereafter, the "*Yearbook*")) is an indicated cost of equity of 9.12%. All three approaches use the compound annual (or geometric) averaging method to determine the actual returns achievable by investors. The traditional and market-based CAPMs I present in this testimony recognize that in the

current troubled financial environment, the risk premium is higher than it historically has been, and so I have added a specific increment to the risk premium that has been caused by the financial worries of the Great Recession. The *Yearbook* method proceeds under the expectation that future conditions will revert back to the mean. Thus, the *Yearbook* method reduces the historical actual return rate earned on common stocks from 1926-2008 from the 9.6% compound annual return actually earned down to 9.0% to correct for the historical effect on growth caused by what was a net increase in the Price/Earnings (P/E) ratio since 1926. P/E ratio changes are believed to be a non-recurring trend that would not be part of the reversion to the mean solution.

Q. HOW DOES YOUR COST OF CAPITAL RECOMMENDATION CHANGE AFTER CONSIDERING THE IMPACT OF THE REVENUE DECOUPLING RATE DESIGN?

A. As explained later in this testimony, implementing a revenue-decoupled rate design removes a considerable amount of the risk borne by Delmarva's common equity investors. It is therefore appropriate to lower the allowed return on equity by at least 0.5% to 1.50% so long as a revenue-decoupled rate design is in effect. Using an 8.50% cost of equity reduces Delmarva's overall cost of capital from 7.18% to 6.70%.

Q. COMPANY COST OF CAPITAL WITNESS DR. MORIN HAS RECOMMENDED A COST OF EQUITY OF 11% WITHOUT A REVENUE DECOUPLED RATE DESIGN AND 10.75% WITH A REVENUE-DECOUPLED RATE DESIGN. WHAT ARE THE PRIMARY DIFFERENCES BETWEEN HIS RECOMMENDATION AND YOUR FINDINGS?

A. Both Dr. Morin and I use the DCF and CAPM methods to derive our recommended cost of equity. While there is no such thing as obtaining a perfect cost of equity answer from any cost of equity approach, both Dr. Morin's DCF and CAPM

approaches contain serious, definable, readily avoidable flaws that, in the current financial environment, cause them to materially overstate the cost of equity.

As I will explain later in this testimony, the primary flaws in Dr. Morin's DCF method are: (1) he relies on analysts' short-term growth rates as his proxy for long-term growth; and (2) he fails to do anything to ensure that his growth rate has any consistency with the dividend rate he used to compute the dividend yield. If, as is explained above, changes in the P/E ratio require a meaningful 0.6% reduction to the growth rate that occurred over an 82-year period, imagine how much more of a distortion changes in the P/E ratio could have over the five- to six-year periods over which Dr. Morin's analysts' growth rates were quantified[1].

As I will also explain later in this testimony, Dr. Morin's CAPM approach overstates the cost of equity because it is based on arithmetic average returns that are not obtainable in the real world. Although Dr. Morin has been making this same mistake for years, his use OF the arithmetic average does not create as large of a difference between his CAPM method and mine as it usually does because he did not adjust his result upward to account for the increment to the risk premium caused by heightened investor fears created by the Great Recession.

Q. DOES RECOGNITION OF THE HIGHER RISK PREMIUM CAUSED BY THE GREAT RECESSION MEAN THAT YOU ARE ADJUSTING THE RESULT SO THAT A PREMIUM IS ADDED TO THE COST OF EQUITY TO OFFSET THE EFFECT OF MORE DIFFICULT TIMES?

A. No. In these financial times that are the most extreme since the Great Depression of the 1930's, several factors that influence the cost of equity computation are distorted. From the perspective of the CAPM, the risk-free interest rate has become abnormally

[1] *Ibbotson SBBI 2009 Classic Yearbook*, page 144.

low due to investors' unusually intense flight to quality. To make the CAPM result based on historical numbers still have relevance today, this difference should be recognized and treated accordingly.

Q. ARE THERE ANY OTHER DIFFERENCES BETWEEN DR. MORIN'S AND YOUR RECOMMENDATIONS?

A. Yes. Another difference between Dr. Morin's and my recommendations is his 0.30% allowance for financing costs. As I explain later in this testimony, the actual financing costs Delmarva incurred to raise equity over the last 20 years were only 0.05% per year, which is a small fraction of this 0.30%. See the computation on page 78 of this testimony. This 0.05% is so small that it is easily offset by the impact of selling stock above book value. This means that the Commission's decision in Delmarva's last case to reject an allowance for financing costs is still correct.

Dr. Morin based his recommended 0.25% reduction to the cost of equity to account for a revenue-decoupled rate design on his judgment that Delmarva's business risk score and beta would be lower with the new rate design than they would be otherwise. (Morin Direct, pages 46-48). This 0.25% is unrealistically low because Delmarva's revenue decoupling will reduce its non-diversifiable risk far more than he claims.[2]

IV. CAPITAL STRUCTURE AND COST OF DEBT

Q. WHAT IS THE APPROPRIATE CAPITAL STRUCTURE TO USE FOR DETERMINING THE OVERALL COST OF CAPITAL FOR DELMARVA?

[2] In this regard, it is curious that Dr. Morin characterized a risk differential of 2.8% between the cost of utility debt and equity as small, even though his recommended 0.25% reduction in the cost of equity caused by something with as large a risk reduction result as revenue decoupling is less than one-tenth the amount of that bond to equity risk premium.

A. As shown on Schedule JAR 7, Page 2 I have computed my recommended cost of capital to Delmarva based on the capital structure recommended by the Company. I did so reluctantly because the requested capital structure fails to include any short-term debt. Historically, Delmarva has used a considerable amount of short-term debt, and the comparative electric and gas companies obtained 6.68% of their total capital from short-term debt.[3] I did not include short-term debt because Delmarva is currently not using any. However, since short-term debt is currently the most inexpensive source of investor-supplied capital, it could be reasonable to add short-term debt to the capital structure in the future, especially if Delmarva returns to its prior practice of using a significant amount of short-term debt between now and the next rate case.

Q. ARE YOU AWARE OF ANY REPORTS THAT ADDRESS DELMARVA'S USE OF SHORT-TERM DEBT?

A. Yes. In its November 19, 2009 report to the Commission, Liberty Consulting Group concluded that Delmarva used "[h]igh levels of short-term debt (5 sources) to fund DPL 2008 ops," including its own $500 million commercial paper program, $150 million short-term bank loan that matured in July 2009, and extensive use of the PHI money pool until the development of the 10/2008 liquidity crisis. Furthermore, the Fitch ratings report[4] shows that for every time period reported from 2003-07, Delmarva was using a substantial amount of short-term debt. The amounts reported varied from a low of $105 million on 3/28/2008 to a high of $286 million on 12/31/07. Furthermore,

[3] Schedule JAR 7, Page 1.

[4] Provided in response to PSC-COC-6 (Attachment 16).

Delmarva's 10K report filed with the Securities and Exchange Commission states that Delmarva was using $246 million of short-term debt as of 12/31/2008[5].

Q. WHAT DID YOU USE FOR THE COST OF LONG-TERM DEBT?

A. The Company has requested an embedded cost of long-term debt of 5.45%. See Schedule RAM-14. This embedded cost of debt computation was made without any consideration for what impact unregulated activities might have had on the amount. Liberty Consulting Group has advised me that unregulated activities have caused two problems. First, on November 25, 2008 Delmarva issued $250 million of long-term debt right in the middle of the severe financial crisis. Absent the extreme liquidity requirements of the non-utility affiliates at that time, it is Liberty's view that Delmarva would have avoided entering the financial markets at a time of such severe distress. Liberty believes that Delmarva, absent non-utility requirements, would likely have waited at least until the first quarter of 2009. Second, Liberty concluded that both the $250 million debt issuance made in November 2008 and the subsequent $100 million debt financing made on 9/1/2009 (both shown on Dr. Morin's Schedule RAM-17) would have had a higher bond rating by about "one notch" if not for the impact of the unregulated activities. One notch is equal to approximately 1/3 of the way between adjacent bond ratings.

Q. HOW DO THESE TWO ISSUES IMPACT DELMARVA'S COST OF DEBT COMPUTATION?

A. Delmarva's November 2008 $250 million debt issuance has an interest rate of 6.40% (Schedule RAM-17). As shown on my Schedule JAR-4, Page 2, if this issuance had been made at the rate that was on average available in the first quarter of 2009

[5] Obtained from SEC.gov website. Information is on page 285 of that report.

instead, and if the impact of unregulated activities is excluded, then the cost of this debt would have been 5.31% instead of 6.40%. As also shown on Schedule JAR-4, Page 2 the cost of the debt incurred by Delmarva on its September 2009 debt issuance would have been about 4.73% instead of 5.00% .

Q. HOW DO THE ABOVE CORRECTIONS TO THE COMPANY'S REQUESTED COST OF CAPITAL INFLUENCE THE OVERALL RESULT?

A. As shown on Schedule JAR 4, Page 1, the impact of correcting for the timing of the $250 million debt issuance and of eliminating the effect of unregulated activities is to lower Delmarva's embedded cost of debt from 5.45% to 5.08%.

V. COST OF EQUITY DETERMINATION

A. DCF METHOD

Q. PLEASE SUMMARIZE THE RESULTS YOU OBTAINED WHEN APPLYING THE DCF METHOD.

A. The DCF method applied to the same group of combination electric and gas companies that Company witness Dr. Morin used results in an indicated cost of equity of 9.55% as of the end of 2009 and 9.86% based on average stock prices for all of 2009.[6] The result from the end of 2009 is more applicable because the trauma experienced by the financial markets in early 2009 is, fortunately, no longer applicable. Furthermore, it is necessary to reduce this result by 0.15%.to recognize that Delmarva's proposed capital structure contains a higher percentage of common equity than the average capital structure of the comparative group.

Schedule JAR 5, Page 1 shows the details of my DCF computation for the combination gas and electric utilities. The dividend yield as of 12/31/09 was 4.39%. I

[6] I also applied the DCF method to the group of S&P utilities that Dr. Morin used, but did not give weight to those results because this group is not as good a fit to Delmarva.

added 0.11% to the dividend yield to allow for growth in dividends to next year. I estimated the overall growth rate to be 5.05%, consisting of 4.59% for reinvestment growth and 0.46% for new financing growth. I computed the 4.59% reinvestment growth using the retention growth method.

Q. HOW DID YOU OBTAIN THE COMPARATIVE GROUP OF ELECTRIC AND GAS COMPANIES?

A. I used the same group of electric and gas companies selected by Dr. Morin, except that I excluded North Western Corp. because it was not covered by Value Line's standard edition. It should be noted that based on Dr. Morin's selection criteria, these companies could have as much as 49% of unregulated operations. Therefore, the cost of equity result for this group is probably higher than appropriate for Delmarva because of the upward influence on the cost of equity these unregulated activities likely have. This could make my cost of equity recommendation conservatively high, especially in this highly risk-averse financial market.

Q. WHAT IS THE DISCOUNTED CASH FLOW METHOD?

A. The Discounted Cash Flow (DCF) method is an approach to determine the cost of equity that recognizes that investors purchase common stock to receive future cash payments. These payments come from (a) current and future dividends; and (b) proceeds from selling stock.

Q. HAVE INVESTORS ALWAYS USED THE DCF METHOD ?

A. While investors who buy stock have always done so for future cash flow, the DCF approach first appeared in the 1937 Harvard PhD thesis of John Burr Williams entitled *The Theory of Investment Value.* "Williams's model for valuing a security calls for the investor to make a long-run projection of a company's future dividend payments

...".[7] The Williams DCF model separately discounts each and every future expected cash flow.

Q. WHAT DID INVESTORS DO TO EVALUATE STOCKS BEFORE WILLIAMS INTRODUCED THE DCF METHOD?

A. Before the DCF method, investors used methods such as P/E ratios [or its reciprocal the E/P ratio, or earnings yield], or dividend yields (D/P). While these methods are still used today, knowledgeable investors are aware that they are very incomplete and provide only rough guidelines to investment value.

The appropriate P/E ratio for a company with high growth prospects can be much higher than for a company with meager growth opportunities. Therefore, P/E ratios alone do not predict the total return an investor expects to earn from purchasing stock in that company. Similarly, the D/P analysis cannot distinguish important differences between companies with similar D/P ratios but vastly different prospects for future dividend payments. By concentrating on both current dividends and future expected dividend payments, the Williams DCF model filled in the major gaps in the P/E ratio and D/P methods.

Q. BY USING CASH FLOW EXPECTATIONS AS THE VALUATION PARAMETER, DOES THE WILLIAMS DCF MODEL EFFECTIVELY IGNORE EARNINGS?

A. No. Instead, it separates the two ways that earnings create cash flow:

> 1) DIVIDENDS. Earnings paid out as dividends, and
>
> 2) GROWTH. Earnings retained in the business and reinvested to help maintain or grow future earnings, i.e. the portion of earnings that causes future growth in dividends.

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[7] P. BERNSTEIN, *Capital Ideas: The Improbable Origins of Modern Wall Street* (The Free Press © 1992).

Dividends are the only source of cash to the investor while the stock is owned. For companies that pay dividends, those payments continue until the stock is sold. The sales price obtainable when the stock is sold is dependent upon investors' expectations of future dividends at that time.

Every dollar of earnings is used for the benefit of stockholders, either in the form of a dividend payment or earnings reinvested for future growth in earnings and/or dividends. Earnings paid out as a dividend have a different value to investors than earnings retained in the business. Recognizing this difference and properly considering it in the quantification process is a major strength of the DCF model, and is why the Williams DCF model is a major improvement over either the P/E ratio or D/P methods.

Q. WHY IS THERE A DIFFERENCE TO INVESTORS IN THE VALUE OF EARNINGS PAID OUT AS A DIVIDEND COMPARED TO THE VALUE OF EARINGS RETAINED IN THE BUSINESS?

A. Earnings retained in the business earn a return depending upon the opportunities available to that company. If a regulated utility reinvests earnings in needed used and useful utility assets, then those reinvested earnings earn at whatever return is consistent with the ratemaking procedures allowed and the skill of management.

When an investor receives a dividend, he can either reinvest it in the same or another company or use it for other things, such as paying down debt or paying living expenses. Although an investor could theoretically use the proceeds from any dividend payments to simply buy more stock in the same company, when an investor increases his investment in a company by purchasing more stock the transaction occurs at market price. However, when the same investor sees his investment in a company increase because earnings are retained rather than paid as a dividend, the reinvestment occurs at

book value. Stated within the context of the DCF terminology: earnings retained in the business earn at the future expected return on book equity "r," and dividends used to purchase new stock earn at the rate "k." When the market price is above book value, retained earnings are worth more than earnings paid out as a dividend because "r" will be higher than "k." Conversely, when the market price is below book value, "k" will be higher than "r," meaning that earnings paid out as a dividend earn a higher rate than retained earnings.

Q. IF RETAINED EARNINGS ARE MORE VALUABLE WHEN THE MARKET-TO-BOOK RATIO IS ABOVE 1.0, WHY WOULD A COMPANY WITH A MARKET-TO-BOOK ABOVE 1.0 PAY A DIVIDEND RATHER THAN RETAIN ALL OF THE EARNINGS?

A. Retained earnings are only more valuable than dividends if there are sufficient opportunities to profitably reinvest those earnings. Regulated utility companies are only allowed to earn the cost of capital on used and useful assets that are needed to provide safe and adequate utility service. Investing in assets that are not needed will not produce any return at all. For unregulated companies, opportunities to reinvest funds are limited by the demands of the business. How many new computer chips can Intel profitably develop at the same time?

Q. DOES THIS DIFFERENCE IN THE VALUATION OF EARNINGS PAID OUT AS A DIVIDEND AND RETAINED EARNINGS CAUSE ANY INHERENT BIAS IN THE RESULTS OF THE DCF MODEL WHEN THE MARKET-TO-BOOK RATIO IS DIFFERENT THAN 1.0?

A. No, this is not true from the perspective of the DCF method as it is and should be applied in regulated public utility rate proceedings. In fact, just the opposite is true: because the DCF model is specifically designed to recognize the difference in the value of earnings paid out as a dividend and retained earnings, a properly applied DCF model

maintains its accuracy irrespective of the market-to-book ratio. It is old methods like the P/E ratio whose accuracy deteriorates as the market-to-book ratio varies from unity.

Q. HAVE YOU SEEN WITNESSES IN PUBLIC UTILITY RATE PROCEEDINGS CLAIM THAT THE DCF METHOD LOSES ITS ACCURACY AS THE MARKET-TO-BOOK RATIO VARIES FROM 1.0?

A. Yes. However, such a statement could only be true if: (1) the form of the DCF model being used by that person were defective; or (2) if the result of the DCF model were being used for a different purpose other than that rate proceeding.

Q. PLEASE PROVIDE AN EXAMPLE OF USING THE DCF MODEL FOR A DIFFERENT PURPOSE THAN IT IS USED IN UTILITY RATE PROCEEDINGS.

A. In utility rate proceedings, the cost of equity should be the return rate that will allow a company to earn enough to maintain the original cost valuation. In other words, when a utility raises capital from equity investors (whether through the sale of new common stock or by retaining earnings), it uses the proceeds from that sale to purchase utility assets. Assuming that the assets are used and useful, those assets are added to rate base at an amount equal to their net original cost. The return rate being earned by those assets should be sufficient to allow investors to conclude that the net present value of the income stream anticipated from that cash flow is equivalent to the net original cost of the assets.

While it is never appropriate to do so in utility rate proceedings, there are times when the management of unregulated companies looks at the DCF result differently. They might not be concerned with the cost of equity, but instead may care about maintaining a specific stock price. Under such circumstances, the term "cost of equity" as we use it in utility rate proceedings might be confused with the similar sounding but

completely different "return on book equity" that must be earned in order to maintain the company's stock price.

Management of a company with a high stock price (because it is earning a very high return on book equity) might consider its "cost" of equity to be equal to the return required to maintain the current stock price rather than using the attraction standard appropriate for ratemaking purposes. People who do not understand this difference could be misled into thinking that the result from a properly applied DCF method in a utility rate proceeding does not understate the cost of equity when market-to-book ratios are above 1.0.

Q. UNDER THE WILLIAMS FORM OF THE DCF MODEL, IS IT NECESSARY FOR EARNINGS AND DIVIDENDS TO GROW AT A CONSTANT RATE FOR THE MODEL TO BE ABLE TO ACCURATELY DETERMINE THE DCF-INDICATED COST OF EQUITY?

A. No. Because the Williams DCF model separately discounts each and every future expected cash flow, it does *not* rely on any assumptions of constant growth. The dividend yield can be different from period to period, and growth can bounce around in any imaginable pattern without harming the accuracy of the answer obtained from quantifying those expectations. When the Williams DCF model is correctly used, the answer obtained is as accurate as the estimates of future cash flow. Even though the Williams model maintains mathematical precision, as with any valid equation, its accuracy remains dependent upon the accuracy of the determination of the future cash flow expectations.

Q. IS THE WILLIAMS DCF MODEL GENERALLY USED IN UTILITY RATE PROCEEDINGS?

A. While the Williams DCF model could be used today, it is far more common in utility rate proceedings to use the simplified D/P + g form of the DCF model (often referred to as the Gordon model).[8] Only when this "constant growth" is a reasonable expectation is the result of the D/P +g form of the DCF model identical to the result obtained from the Williams model (which requires a separate discounting calculation for each and every future expected cash flow).

Q. WHAT IS THE GORDON CONSTANT GROWTH FORM OF THE DCF MODEL?

A. The Gordon model is the equation:[9]

k= D/P + g, where:

k= cost of equity;
D=Dividend rate; and
P=Market price of stock.

In the above equation,

g=the growth rate, where g= br + sv;
b=the earnings retention rate;
r=rate of return on common equity investment;
v=the fraction of funds raised by the sale of stock that increases the book value of the existing shareholders' common equity; and
s=the rate of continuous new stock financing.

The Gordon model is therefore correctly recognized to be:

k=D/P + br +sv

[8] The Gordon model is named after Dr. Myron Gordon, who is generally recognized as the first person to use the DCF model in utility rate proceedings. He demonstrated that it was possible to simplify the Williams DCF model for application to public utility companies.

[9] M. GORDON, *Cost of Capital to a Public Utility*, at 32-33 (MSU Public Utility Studies 1974).

Q. DOES THIS MEAN THAT UNLESS FUTURE GROWTH FOR ALL THESE ITEMS TURNS OUT TO BE EXACTLY THE SAME, THE CONSTANT GROWTH, OR GORDON, MODEL CANNOT BE USED?

A. No. Of course, in the real world there would virtually never be an instance where earnings, dividends, stock price, and book value would all actually grow at the same rate as each other and at the same rate in every future year. But, so long as the *best estimate* of what future growth for all will be can be reasonably estimated as the same growth rate, then it can be proper to use the Gordon constant growth form of the DCF model. For example, if an investor expects that future dividends, earnings, book value, and stock price will grow at 4% per year with unpredictable random variations of +/- 0.5% in each year, then the 4% growth rate will produce the correct answer in the constant growth DCF model (i.e. exactly the same answer as in the Williams DCF model) because it is the best estimate of what investors expect for future growth.

Q. ARE THERE ANY IMPORTANT CONSIDERATIONS IN DETERMINING HOW TO DETERMINE THE INPUTS INTO THE VARIABLES IN THE CONSTANT GROWTH DCF MODEL?

A. Yes. One important and commonly overlooked consideration is the basic principle behind the DCF method: that it works because it first divides all future expected earnings into either dividend yield or growth, and then values each stream separately. Implementations of the constant growth DCF model tend to be consistent in recognizing that the future cash flow from dividends must be valued separately from the portion of retained earnings. However, needless inaccuracies occur when users of the constant growth DCF method fail to respect the necessity to count all future expected earnings once and only once. Leave some of the future expected earnings out, and the

DCF method will tend to understate the cost of equity. Double-count some of the future expected earnings, and the DCF method will tend to overstate the cost of equity.

Q. WHAT HAPPENS IF THE CONSTANT GROWTH DCF MODEL IS USED WITH SOME VALUE OTHER THAN BR + SV FOR G?

Unless great care is taken in obtaining "g," the model suffers what could be a substantial loss of its mathematical integrity because it is likely that such an alternative growth rate will not be the kind of growth that is *required* for use in the constant growth DCF model: namely a growth rate that is reasonably representative of long-term future expected growth in dividends, earnings, book value and stock price.

A common mistake in implementing the constant growth DCF model is to oversimplify the process by using analysts' unadjusted five-year earnings per share ("EPS") growth rate as a proxy for long-term sustainable constant growth. While these growth rates may provide some guidance in determining what future cash flows will be, they should never be used in the constant growth DCF model without making adjustments for their known deficiencies as a proxy for the kind of growth required for "g" in the constant growth form of the DCF model.

Q. WHY IS IT INCORRECT TO SIMPLY INPUT ANALYSTS' GROWTH RATES AS THE VALUE OF "G" IN THE CONSTANT GROWTH DCF FORMULA?

A. Those that mistakenly use analysts' growth rates in the DCF formula typically use sources such as Zacks (which compiles the consensus of analysts' five year EPS growth rates), or Value Line (which provides its own 3-5 or 4-6 year growth rates). The following explains why analysts' consensus five-year EPS growth rates and Value Line growth rates are different from what is mathematically appropriate for what is required for "g."

ANALYSTS' CONSENSUS GROWTH RATES. Zacks is a service that surveys investment analysts from numerous investment banking firms. The longest-term growth rate that it compiles, and the one generally applied by those that misuse this approach to growth, is the five-year EPS growth rate. To obtain this growth rate, Zacks asks analysts to tell it what they expect will be the compound annual growth in EPS from the most recently completed fiscal year to a period five years into the future. While this type of growth might provide a window into what investors expect for earnings over the next five years, it does not indicate cash flow, either over the five years of the projection period or for the time after the projection period. This is because: (a) the portion of EPS growth rates caused by expected changes in the earned return on book equity are not reflective of dividend per share changes or stock price changes, and (b) anticipated changes in the dividend payout ratio over the five-year period can cause a change in the relationship between the cash flow anticipated from current dividends and from the future growth in dividends, which in turn causes the dividend per share growth rate during and beyond the five-year analysts' forecast period to be materially different than EPS growth.

VALUE LINE EPS GROWTH RATE PROJECTIONS. Value Line is an investment advisory service that is commonly used by cost of capital witnesses in utility rate proceedings. It provides significant detail about numerous companies, including the majority of large regulated public utilities. It includes much historical and projected financial data on each company it covers, such as historical growth rates in revenues, cash flow, earnings, dividends, and book value. It also provides estimated future compound annual growth rates that are derived by taking an average of a three-year

historical base period to a period approximately five years out into the future, although the exact time of the forecast varies seasonally. It also provides its own estimate of the future stock price, thus making it possible to compute what it expects the compound annual growth in stock price to be. Additionally, it publishes what it believes will be the total annual return earned by an investor purchasing stock in the particular company - with total return being the dividends and stock price appreciation.

The main differences between Value Line's future oriented growth rates and the growth rates compiled by Zacks are that: (1) rather than simply using a one-year base period, Value Line provides some attempt at a partial normalization because it uses a three year period; and (2) Value Line provides a forecast for much more than just earnings.

It would be invalid to apply the constant growth DCF method by simply adding the Value Line approximately five-year EPS growth rate to the dividend yield. Factors such as the forecasted dividend growth rate, the forecasted stock price, forecasted changes in the dividend payout ratio or changes in the earned return on book equity between the three-year base period and the end years of the forecast all have a huge impact on the proper inputs into a long-term sustainable growth rate. For example, if EPS are forecasted to grow more rapidly than book value per share over the period being examined by Value Line, then in this period earnings are growing at an abnormal, unsustainable rate. The peril in ignoring these other factors is a needlessly inaccurate DCF result.

Q. HOW DO ANALYSTS' FORECASTED CHANGES IN EPS GROWTH RATE CAUSED BY EXPECTED CHANGES IN THE EARNED RETURN ON BOOK EQUITY CAUSE A SERIOUS PROBLEM FOR THOSE WHO

MISTAKENLY USE UNADJUSTED ANALYSTS' EPS FORECASTS AS THE VALUE OF G IN THE DCF MODEL?

A. Consider what happens in a five year period where the base year's earnings are impacted by weather conditions, abnormal expenses, time cycle between rate cases, a recession, etc., and analysts' forecasts for the future are based on conditions returning to normal. Under such circumstances, the earnings growth over the five-year period compiled by Zacks will include the catch-up growth rate that is nothing but some temporary extraordinary growth that occurs when earnings climb out of a recession and go back to normal. Commonly, however, dividends and stock prices do *not* decline the same amount as earnings do in response to abnormal changes. Remember that the basic premise of the DCF method is that an investor purchases a security for the benefits of the cash flow it will provide in the form of dividends and proceeds when the stock is sold. When, as is commonly the case over a five-year period, dividends and stock price are expected to grow at a different rate than earnings, this analysts' consensus growth rate blatantly violates the growth that is needed for the proper input into the constant growth DCF formula.

Q. IS THERE A SIMPLE WAY TO IDENTIFY WHEN THE GROWTH RATE IN EPS FORECASTED BY ANALYSTS IS NOT REPRESENTATIVE OF THE LONG-TERM SUSTAINABLE CONSTANT GROWTH RATE REQUIRED TO ACCURATELY IMPLEMENT THE CONSTANT GROWTH DCF MODEL?

A. Yes. One way is to look for forecasted changes in the earned return on book equity. Changes in the earned return on book equity are not sustainable because, if increasing, either competitive or regulatory pressures provide a practical limit on how high an earned return on equity can grow. For example, if there is some five year period where a company's earned return on equity is expected to increase from 8% in the most

recent historical year up to12% in the last year of the projection, any EPS increase required to make this expectation a reality would not occur in the future unless the earned return on equity continued to increase at the same rate in the future. While it might be possible to find companies that are expected to see earned returns on equity sustained at a level such as 12% on book, a return on equity over the subsequent five years that would result from a further increase in the earned return on equity from 12% to 16% followed by an increase from 16% to 20%, etc. becomes increasingly less and less credible. In fact, for regulated public utilities, future expected returns on equity as high as 16% are rare and sustainable returns above 20% really start to stretch the imagination. When an expected future return of 16% en route to 20% starts to become a remote possibility for one company (let alone in aggregate for a group of utilities selected to be comparable), such a result has no credibility whatsoever, yet such returns would commonly have to be expected to occur eventually if the component of EPS growth were incorrectly allowed to stay as part of the "g" term mistakenly used in the constant growth form of the DCF method.

Q. HOW ARE ANALYSTS' FORECASTS USEFUL IN APPLYING THE CONSTANT GROWTH DCF FORMULA?

A. Whether using the constant growth or more complex form of the DCF model, the approach depends on a forecast of future cash flows (dividends and stock price appreciation). As explained above, EPS growth rates are a very poor indicator of cash flow from dividends or stock price appreciation in a short-run period such as five years, but it is possible to use analysts' forecasts as part of the input for determining a sustainable growth rate.

The way that analysts' forecasts can be useful is to examine what return on book equity analysts believe a company will be able to earn in five years. Typically, when analysts go out for five years, the forecast for that period is based upon an expectation of the year being normal. Knowing what the analyst expects the return on book equity to be in a normal year provides one insight into what investors expect as the future sustainable return. This future sustainable return on book equity is an important input into the computation of "g" because "g" is defined as "br" + "sv," where "r" is the sustainable earned return on book equity.

Value Line specifically provides what it believes will be the future expected return on equity for the companies it covers. The earned return on equity that would be required to achieve the forecasted earnings growth rate can only be estimated for the Zacks earnings consensus since Zacks does not provide five-year forecasts of dividends or book value. While it is simple to compute the future expected EPS consistent with the Zacks consensus growth rate because earnings in the base year can be escalated at the specified EPS growth rate, computing the earned return on equity requires knowing what the projected book value per share will be.

The level of earned return on book equity consistent with the Zacks consensus forecast can only be estimated if assumptions are made about future dividend payout ratios and the impact that sales of new common stock above book value will have on book value growth. Book value growth from retained earnings can be estimated by: (1) adding earnings to book value and subtracting dividends from book value; and (2) making an estimate of the growth in book value caused by the sale of common stock above book value. Since the Zacks consensus forecast fails to provide the future

expected return on book equity, the dividend growth rate, or information needed to determine what level of the increase in book value was caused by sales of common stock above book value, other resources such as Value Line must be used to supplement the Zacks information. Once an estimate for the future book value is obtained, the future expected earned return on book value can be computed by simply dividing the projected earnings by the projected book value.

Q. YOU HAVE EXPLAINED WHY ANALYSTS' FIVE-YEAR EPS FORECASTS REQUIRE SUSTAINABILITY ADJUSTMENTS BEFORE BEING USED AS THE VALUE FOR "G" IN THE CONSTANT GROWTH DCF FORMULA. ARE SIMILAR ADJUSTMENTS REQUIRED TO THE BR + SV APPROACH?

A. No. Unlike the DCF approach based on analysts' forecasts, the values for the retention rate "b" and the future expected return on equity "r" are already the same in the beginning year as in the ending year. Therefore, no adjustments are needed.

The "br" term is used to compute the growth rate that results from retained earnings, while the sv term is used to quantify sustainable growth that can occur if a company is able to consistently sell new common stock at a price above book value. Both the "br" and "sv" growth are sustainable growth rate methods because they result in permanent increases to the company's book value per share. In the case of "br," book value per share grows because the retained earnings become part of this component of book equity. In the case of "sv," book value grows because the sale of new common stock above book value increases total book value more rapidly than the corresponding increase in the number of shares outstanding, making the result from dividing total book value by the number of shares outstanding higher than before the new equity sale.

Q. WHY ARE THESE ITEMS THAT PERPETUALLY INCREASE BOOK VALUE PER SHARE REASONABLE MEASURES OF SUSTAINABLE GROWTH?

A. Companies earn profits by making sensible purchases of assets that are used and useful in operating a business. As the amount of used and useful assets available to produce income goes up, the ability of a company to earn larger amounts also goes up. Of course, every time a company earns more money, it must do something with those funds. Not all businesses can readily use the capital provided from the new earnings in used and useful assets within the businesses that they understand and are capable of managing. Moreover, as the amount of new capital that becomes available grows larger, the array of potentially profitable new assets may become progressively less attractive. If and when the opportunity to reinvest the earnings wisely is sufficiently diminished, then good management will send the earnings that cannot be deployed with a sufficiently large profit opportunity to investors as a dividend. Since the ability to relieve a company of the requirement to earn an acceptable return on retained earnings above the level needed for reinvestment exists through dividend policy, good management will confine earnings reinvestment activities to only those that make financial sense: that is, the ones that management perceives to be able to earn a reasonable return on book equity. The EPS growth from retained earnings is equal to the amount of those retained earnings times the return on book equity that those earnings achieve.

Q. IS IT POSSIBLE THAT THE EARNINGS GROWTH THAT RESULTS FROM RETAINED EARNINGS WILL VARY IN RESPONSE TO CHANGES IN THE EARNED RETURN ON BOOK EQUITY?

A. Yes, the actual earned return on book equity fluctuates. However, for a regulated utility's investments in used and useful utility plant that is added to regulated rate base, this variation will usually be within a relatively narrow range surrounding its allowed return. While changes in the earned return might not be predictable, the average return the new plant investment will earn can generally be determined with reasonable accuracy. A utility's investment in plant under construction might not be immediately added to rate base, but many such projects earn an Allowance for Funds Used During Construction instead of a return on rate base that produces earnings growth comparable to used and useful assets that are added to rate base. For unregulated companies, or the unregulated operations of companies that own regulated utilities, the earned return opportunities on new investments are not controlled by commission-authorized returns, but instead are limited by the normal give and take of competition. Future actual earned returns for new investments made by a company in unregulated activities can be estimated by examining both historical actual earned returns on book equity and future expected returns on book equity as estimated by analysts.

Q. CAN CHANGES IN THE OVERALL EARNED RETURN IMPACT GROWTH ABOVE AND BEYOND WHATEVER GROWTH RESULTS FROM EARNINGS RETENTION?

A. Yes, but one-time changes in EPS caused by a perceived change in the future expected earned return are unsustainable. The new perceived earned return on book equity should be part of the computation, but the one-time growth spurt to get there should *not*. A champion marathon runner might be able to run 26 miles in a little over two hours, but this does not mean that he could cover 52 miles in a little more than four hours.

Q. HOW CAN INACCURACIES IN THE DCF RESULT CAUSED BY FORECASTED DIFFERENCES BETWEEN THE EPS GROWTH RATE AND THE DIVIDENDS PER SHARE GROWTH RATE BE ELIMINATED?

A. One way to correct such a problem is to reject the constant growth DCF model in favor of the complex version.[10] The complex form separately discounts the anticipated cash flow in each subsequent year so that changes in the dividend payout ratio and anticipated changes in the earned return on book equity can both be quantified in a way that retains mathematical accuracy. The simplest way to avoid adding this extra complexity in a way that, especially for regulated public utility companies, will generally retain mostly all of the accuracy obtainable from the complex model is to quantify growth by using "br" + "sv," in which:

1. The retention rate "b" is the earnings retention ratio computed to be consistent with the dividend rate used in the D/P term of the constant growth DCF formula, and

2. It is recognized that at any point in time, the price investors are willing to pay for a company's stock relates to what earnings are expected at that time. The only relevant estimate of the return on equity "r" that should be used in the DCF formula is the one that investors expect to be on average earned at the time of the quantification of the stock price used in the DCF formula.

By following these two relatively simple guidelines, the accuracy of the DCF method will in most cases be almost entirely related to the quality of the estimate for the value of the future expected return on book equity, "r." Otherwise, the accuracy is

[10] I am aware that the cost of capital consultants that the Commission Staff has used in prior years have used the simplified constant growth DCF model and have used analysts' five-year growth estimates as an input; however, for the reasons that I will explain, I believe it is more appropriate to use analysts' forecasts to help quantify the future expected return on equity and to then use that expected return on equity in the sustainable growth rate computation. Doing so produces a DCF result that is based on a more precise quantification of future expected cash flows.

subject to both the quality of the estimate of future growth and the mathematical inaccuracies that result from trying to fit non-constant growth estimates into a formula that has a mathematical requirement for constant growth.

Q. ARE YOU AWARE OF CLAIMS THAT A PROBLEM WITH THE "BR" APPROACH TO THE CONSTANT GROWTH DCF MODEL IS THAT IT RELIES ON THE VALUE OF THE FUTURE EXPECTED RETURN ON BOOK EQUITY "R" TO ESTIMATE WHAT THE EARNED RETURN ON EQUITY SHOULD BE?

A. Yes, however the concern is as invalid as saying thermostats can't work because they use room temperature to set room temperature.

Q. PLEASE EXPLAIN.

A. The cost of equity, "k," is not the same variable as the future expected earned return on equity "r." In fact, there often is a large difference between the two. As Mark Twain once said, the difference between "lightning" and "lightning bug" is but one word.

Determining the cost of equity is *not* just about finding what return on book equity investors expect a company will earn, but also about quantifying how investors react to that expected return. That is where stock price comes in. For bond yield, when investors perceive the coupon yield interest rate to be higher than needed, they bid up the bond's price. Conversely, if investors perceive the coupon yield to be inadequately low, the price of the bond drops. Exactly the same is true for the price of common stock. The difference is that the coupon yield is known for bonds, whereas for stocks the future expected return on book equity is estimated.

Another reason this criticism is misplaced is because when the DCF method is applied, it equates the stock price *at a given point in time* to investors' expectations *at*

that same time. A commission decision could change investors' expectations for the value of "r" that will be earned in the future, but concurrently with this change in expectations for "r," the stock price will also change. Unless something else changes to either cause the company's risk to be altered or an overall change in financial markets, then the stock price will respond to the change in "r" just enough so that the cost of equity "k" does not change just because "r" changed.

Another way of looking at it is to think about the "br" value in the context of the DCF equation. As previously observed, the whole premise behind the DCF method is that investors purchase a stock to obtain the rights to the future cash flows that will result from its ownership. If the level of expected cash flows changes, the stock price is expected to change accordingly. For example, suppose a commission properly implementing the DCF method is convinced that as of the time of implementation, investors expect the company to be able to earn an average 11% return on book equity. As a result of that expectation and the actual dividend rate, etc. the commission determines that the company's cost of equity is 9%. As a result of the commission's action, investors lower their expectations for the future return on book equity from 11% to 9%. Under such circumstances, the DCF model would predict that the stock price would change so that the cost of equity computed from using the new expected values for D/P + "br" + "sv" would still equal "k." In this example, both "r" and "P" would go down, and other variables in the equation would likely change, but since there would not necessarily be any change in the cost of equity "k," investors would change the stock price so that the cost of equity "k" would remain the same.

Q. DO ANALYSTS' FIVE-YEAR EPS GROWTH RATES OR VALUE LINE FORECASTED EPS GROWTH RATES ALSO SEE THE SAME KIND OF

CHANGE IN COMPUTED GROWTH RATES IF CONDITIONS CAUSE INVESTORS' EXPECTATIONS OF THE FUTURE EXPECTED RETURN ON BOOK EQUITY TO CHANGE?

A. Yes. Whatever method a commission uses to quantify the cost of equity and set final rates, if the rates set vary at all from what investors expect will be earned in the future, both EPS and the future expected return on book equity will change. If future expected EPS change, then the five-year forecasted EPS will change. Actually, because of the inherent inaccuracies in applying the five-year EPS growth rate in the constant growth DCF model, the impact on the growth rate indicator is more for the analysts' five-year EPS growth rate than for the "br" + "sv" growth.

For example, Schedule JAR 3, page 2 shows that Value Line has forecasted an average future expected return on book equity of 11.24% for the "Combination of Gas and Electric" group of comparative companies. It schedule also shows that the average future expected EPS for the group is $3.11[11] while the average actual EPS from 2006 to 2009 was $2.25,[12] for a compound annual increase in EPS from 2009 to 2012-2014 of 7.12%.[13] If utility commissions reduce the return on equity below the level anticipated by Value Line so as to cause Value Line to change its future expected return on book equity, the EPS forecast would have to change accordingly. If this group of companies were expected to earn a return on book equity that was hypothetically 1% less than Value Line's 11.24% forecast, then the EPS would decline from $3.11 per share to

[11] Schedule JAR 3, page 2
[12] Schedule JAR 3, page 2
[13] Schedule JAR 3, page 2

$2.77.[14] This lower forecasted EPS rate would reduce the EPS growth rate from 7.12% to 4.12%.[15]

Q. WOULD THIS 3.00% REDUCTION OF THE EPS GROWTH RATE MEAN THAT REDUCING THE ALLOWED RETURN ON EQUITY BY 1% WOULD REDUCE THE COST OF EQUITY BY 3.00%?

A. No. Just as with a change in the future expected return on book equity "r" when implementing the DCF method, the reduction of the future expected EPS caused by reducing the allowed return on book equity would be accompanied by a reduction in the stock price and a likely corresponding increase in the dividend yield. However, unlike the "br" + "sv" method, because the EPS growth rate method as commonly used is not adjusted to eliminate unsustainable growth, the resultant increase in the dividend yield will not fully offset the effect of the reduction of the EPS growth rate. Therefore, unlike the properly computed "br" + "sv" method, the inherently flawed EPS growth rate method should be expected to falsely report that a change in the allowed return on equity resulted in a change in the cost of equity, "k."

Q. HOW HAVE YOU IMPLEMENTED THE DCF MODEL IN THIS CASE?

A. The DCF method is based upon estimating future cash flows anticipated by investors. Since there is no contract or any other document that definitively determines what investors expect future cash flows to be, there will always be some degree of inaccuracy associated with the DCF method. However, approaches to quantifying the variables in the DCF equation that are inconsistent with the mathematical derivation of the equation can and should be avoided. For all the reasons stated earlier in this

[14] Schedule JAR 3, page 2
[15] Schedule JAR 3, Page 2.

testimony, analysts' five-year EPS forecasts are *not* consistent with the value of "g" in the formula. Even if somehow one knew with certainty what investors expected the five-year EPS forecast to be, if that number were used for "g" it would still produce a wrong answer because it is a non-constant growth rate.

The proper way to adjust for the computational errors that occur because of the impact of non-constant growth when using a five-year analysts' forecast as a proxy for growth is to stay true to the mathematically-derived "k=D/P +(br + sv)" form of the DCF model. Furthermore, when using this formula, one should take care to fully allocate all future expected earnings to either future cash flow in the form of dividends ("D") or to retained earnings (the retention rate, "b"). This extra accuracy is obtained only when the retention rate "b" is derived from the values used for "D" and "r" rather than independently.

Q. PLEASE EXPLAIN HOW YOU OBTAINED THE VAUES TO INPUT INTO THE K=D/P + BR + SV FORM OF THE DCF METHOD.

A. The DCF model generally calls for the use of the dividend expected over the next year. A reasonable way to estimate next year's dividend rate is to increase the quarterly dividend rate by ½ of the current actual quarterly dividend rate. This is a good approximation of the rate that would be obtained if the full prior year's dividend were escalated by the entire growth rate.

Q. CAN YOU PRESENT AN EXAMPLE THAT SHOWS HOW THIS APPROACH WORKS?

A. Yes. Assume a company paid a dividend of $0.50 in the first quarter a year ago, and has a dividend growth rate of 4% per year. This dividend growth rate equals

(1.04)^4-1=0.00985% per quarter. Thus, the dividend is $.5049 in the second quarter, $.5099 in the third quarter, and $0.5149 in the fourth quarter.

If that 4% per annum growth continues into the following year, then the dividend would be $0.5199 in the 1st quarter, $0.5251 in the 2nd quarter, $0.5303 in the 3rd quarter, and $0.5355 in the 4th quarter. Thus, the total dividends for the following year equal $2.111).5199+.5251+.5303+.5355). I computed the dividend yield by taking the current quarter (the $0.5149 in the 4th quarter in this example), and multiplying it by 4 to get an annual rate of $2.06. I then escalated this $2.06 by ½ the 4% growth rate, which means it is increased by 2%. $2.06 x 1.02= $2.101, which is within one cent of the $2.111 obtained in the example.[16]

I obtained the stock price "P" used in my DCF analysis from the closing prices of the stocks on 12/31/09. I also obtained an average stock price for the year 2009 by averaging the high and low stock prices for the year.

I estimated the future expected return on equity, "r," by considering Value Line's future expectation return on book equity (11.26%), the future expectation consistent with Zacks' five year earnings consensus projection (10.5%), and recent actual earned return on equity data (10.72% average for the comparable group of electric and natural gas companies). See Schedule JAR-5, page 1. There is no way to determine precisely what investors expect and no one best way to interpret the data I have presented. Therefore, this is one area where there is room for some (albeit usually relatively

[16] Note that without escalation, the result would have been low by 5.1 cents, and if a full year's growth rate escalation had been used instead of the half year's growth, the result would have been high by over 3 cents. Therefore, using ½ of a year's growth rate is a very reasonable approximation, whereas either of the above alternatives contain noticeable errors.

narrow) difference of opinion. In this case, I concluded that investors expect an average return of 11% on book equity for the comparable group. While other knowledgeable and objective estimates of the future expected returns on book equity that gave rise to the stock prices used in the DCF computation are possible, my 11% estimate is conservatively high; indeed, it is higher than all but one of the inputs identified above.

This 11% return on book equity expectation must *not* be confused with the cost of equity. Since the stock price for the comparative companies is considerably higher than their book value, the return investors expect to receive on their market price investment is considerably less than the anticipated 11% return on book value. What the DCF method is all about is deriving mathematically the relationship between the expected return on book and how, based on market price, investors react to that expectation. The expected return on book equity only says something about the cost of equity *after* that earned return is brought into context by relating it to the market price (or, more precisely, the market-to-book ratio) resulting from that expectation. If the market price is low, the cost of equity will be higher than the future expected return on book equity, and if the market price is high then the return on book equity will be less than the cost of equity.

I quantified reinvestment growth by applying "sv," using the actual market-to-book ratio and the compound annual growth rate of stock that is forecasted to be issued by Value Line.

Schedule JAR-5, Page 1 shows how all of the above inputs were combined to arrive at an indicated cost of equity ranging between 9.55% and 9.86% for the comparative group of electric and gas companies. I reduced these results by 0.15% to

recognize that Delmarva's requested capital structure contains a smaller percentage of common equity than the companies in the comparative group.

B. CAPITAL ASSET PRICING MODEL (CAPM)

Q. PLEASE PROVIDE AN OVERVIEW OF YOUR CAPM CONCLUSIONS.

A. The CAPM method currently indicates a cost of equity of 9.12%, obtained from combining results of the traditional CAPM and a market-derived CAPM and including an additional Great Recession risk premium.

It is interesting to compare my 9.12% CAPM result to the 9% applicable to the SBBI "Large Company Stock" group developed in the *Yearbook* in its interpretation of the 1926-2008 data.[17] Since Delmarva has less risk than the average company to which the 9% is intended to apply, the result applicable to Delmarva would be less than this 9%.

The reason my CAPM-derived 9.12% cost of equity for Delmarva is higher than SBBI's result for riskier companies is because my upward adjustment to recognize the impact of the Great Recession is greater than the appropriate subtraction to account for Delmarva's lower risk.

Q. WHAT IS THE TRADITIONAL CAPM?

A. The traditional CAPM is based on calculating a company's cost of equity by adding a risk premium to a theoretical "risk-free" rate.

Q. WHAT IS THE MARKET-DERIVED CAPM?

[17] *Ibbotson SBBI 2009 Classic Yearbook*, pages 144-45.

A. Rather than effectively taking only two points (the expected return for an average-risk company being one point and the risk-free rate being the other point), the market-derived CAPM model develops the relationship between the cost of equity and beta by graphing the actual earned return and the actual beta. The earned return data from 1926-2008 for each of ten different groups of companies is plotted, and a graph showing the true historical relationship between the beta and the earned return is produced.

Q. IN BOTH THE TRADITIONAL AND THE MARKET-DERIVED CAPM APPROACHES, YOU ADJUSTED THE COST OF EQUITY UPWARD TO ACCOUNT FOR THE SPECIAL RISK PREMIUM CAUSED BY THE GREAT RECESSION. HOW DID YOU QUANTIFY THIS AMOUNT, AND HAVE YOU MADE A SIMILAR ADJUSTMENT IN THE PAST?

A. I quantified this adjustment by observing that the interest rate being demanded by investors on BB-rated bonds in excess of the interest rate on 10-year U.S. treasury bonds is considerably higher than it has been, on average, in the past. In the current highly uncertain financial climate, investors have shown an unusually strong preference for very low risk assets. This has caused investments such as U.S. treasury bills to be yielding especially low interest rates. This flight to quality disappears more rapidly than normal as investors move up to more and more risky investments. The CAPM method is based on examining the relationship between the returns earned on various investment risk classes on average from 1926 to 2008, and the current environment varies greatly from average conditions. Therefore, to make the CAPM method relevant to current market conditions, a special upward adjustment is required.

Q. IF THE NEED FOR THIS UPWARD ADJUSTMENT FADES AWAY IN THE FUTURE WHEN THINGS RETURN TO MORE NORMAL, DOES THIS MEAN THE COST OF EQUITY WILL GO DOWN?

A. No, not necessarily. There are other ways this difference could return to normal. Currently, the interest rates available to investors on low-risk investments are especially low (the 0.061%[18] current interest rate on short-term treasuries is an obvious extreme), but interest rates on longer-term low-risk investments are also low. As the economy recovers, investors will become increasingly willing to take on more risk. As investor risk tolerance returns to normal, the demand for very low-risk investments will go down and the demand for higher-risk investments will go up. Therefore, it could be that rather than the cost of equity decreasing as the extraordinary risk premium returns to normal, the interest rate on lower-risk investments could go up or down depending on how the other distortions in the financial marketplace are reconciled.

Q. PLEASE EXPLAIN HOW DEBT BASED METHODS ARE USED TO ESTIMATE THE COST OF EQUITY.

A. Both the cost of debt and the cost of equity can be viewed to consist of the following components:

(a) Risk-free cost of capital;
(b) Allowance for inflation (to maintain purchasing power of the investor's capital); and
(c) Allowance for risk.

If all three of these components were known, the cost of equity could be determined simply by summing them up. Unlike the cost of equity, the cost of debt may be quantified more precisely. Therefore, much financial work has been done by academics, investment bankers, and investors trying to estimate the cost of equity based upon the cost of debt.

[18] Wall Street Journal, November 9, 2009, 1-month Treasury Bill Yield

Typically, it is reasonable to determine the cost of equity by establishing a risk-free interest rate that includes both the risk-free cost of capital and an allowance for inflation, and adding an appropriate allowance for risk. This approach is based on an expectation that the risk-free cost of capital and the allowance for inflation expressed in the risk-free interest rate and embedded in the computed risk premium is sufficient to fully account for all of the components of the cost of equity.

Parallels between the cost of equity and cost of debt are not perfect because: (a) bond returns are mostly fixed while equity returns are variable; and (b) the time periods over which the various bond's or note's interest rate is applicable can be different, and the allowance for inflation is not necessarily the same for all future time periods. In times when the relationship between the cost of debt and the cost of equity is reasonably normal, these differences are unimportant so long as there is consistency in the compilation of the risk premium data and the risk. Therefore, methods that estimate the cost of equity based on the cost of debt focus on differences in the risk premium.

Q. ARE CONDITIONS CURRENTLY NORMAL?

A. No. In late 2008 and early 2009, the U.S. financial markets experienced a financial trauma that was anything but normal. The banking system was highly stressed by the failure or near-failure of Lehman Brothers, Bear Stearns, AIG, Merrill Lynch, etc. The Federal Reserve dramatically lowered interest rates, and the U.S. Government has implemented (and is continuing to implement) significant spending plans to stimulate the economy. One factor that makes all this important to debt-based equity cost computations is that the allowance for inflation has become more uncertain. Some fear that the weak economy could result in deflation; others worry that large deficit spending

could cause high future inflation rates. This uncertainty makes the allowance for inflation component of the cost of capital a source of greater variability than normal. Since the interest rate on bonds is fixed, while the return on common equity is variable, long-term changes to the inflation rate could increase the risk of investing in bonds more than it would impact the risk of investing in common stocks. To the extent this is true, this factor alone could reduce the cost difference between debt and equity.

Q. WHAT ARE THE RELEVANT DIFFERENCES BETWEEN THE COST OF DEBT AND THE COST OF EQUITY?

A. Investing in bonds is different than purchasing equity because of the following:

a. PAYMENT PRIORITY. Bondholders have a priority right to interest and principal payments before the company's equity holders are paid dividends;

b. FIXED VERSUS VARIABLE PAYMENTS. As mentioned previously, bond payments are fixed, which means they have more inflation risk compared to common stock. In times of high inflation, it is at least possible (but not guaranteed) that a company can raise prices enough to allow earnings to keep pace with inflation, whereas for bondholders that is not possible;

c. INCOME TAXES. Investors are concerned with how much income is received after paying income taxes. In the United States, the income earned on bonds and stocks is taxed differently. Currently, dividends paid on common stocks are often eligible to be taxed at the lower long-term capital gains rate, and the portion of the income investors receive from investing in common stocks does not have to be paid until the stock is sold. The interest income investors receive on bonds is taxed at regular (higher) income tax rates. Sometimes bonds also have a component of the total return that is subject to capital gains treatment in the same way as stocks, but that component is a much smaller percentage of the total return than it generally is for common stocks. Investors such as pension funds are not subject to income taxes, so they do not need to take income tax differences into consideration, but for many other investors, income tax differences can be an important part of the investment decision process.

Typically, methods used to estimate the cost of equity based upon the cost of debt concentrate on quantifying the cost difference based upon the payment priority without giving specific consideration to the latter two points. It is important for users of the method to at least be aware of these points because there are times when they can become critical.

Q. IS AN INVESTMENT IN DEBT LESS RISKY THAN AN INVESTMENT IN COMMON STOCK?

A. For any given company, the risk of investing in its bonds can be expected to be lower than investing in its common stock. Bondholders are paid out of available funds before stockholders are paid, and the size and timing of payments to bondholders are more predictable. It therefore takes a smaller downturn in a company's business for it to fail to earn the dividend payment for equity investors than to fail to earn enough income to make its interest payments to bondholders.

It is theoretically possible that under extreme conditions, the cost of debt will exceed the cost of equity for a given company. This could happen if investors were sufficiently worried about future inflation rates that they perceived the fixed nature of bond payments as a serious problem.

Q. IS THE COST OF DEBT CURRENTLY HIGHER THAN THE COST OF EQUITY?

A. No, not unless the cost of equity for a company of typical risk is being compared to the cost of debt for a highly speculative company. Currently, the cost of 30-year

treasury bonds is 4.26%,[19] suggesting that a company's cost of equity will be higher than its cost of long-term fixed rate debt.[20]

1. TRADITIONAL CAPM

Q. IS THERE A COMMONLY USED METHOD TO DETERMINE THE COST OF EQUITY BASED ON THE COST OF DEBT?

A. Yes. In 1964, William Sharpe developed the Capital Asset Pricing Model, or CAPM.[21] The CAPM method is based on the principle that investors own stocks as part of a diversified portfolio. The return on that portfolio depends upon both the risk-free rate of interest and the risk borne by that portfolio. The only risk that impacts the return available to investors is the return that reflects the elimination of non-diversifiable risk. Dr. Sharpe defined the relationship between risk and return as "The Security Market Line" (SML)[22]:

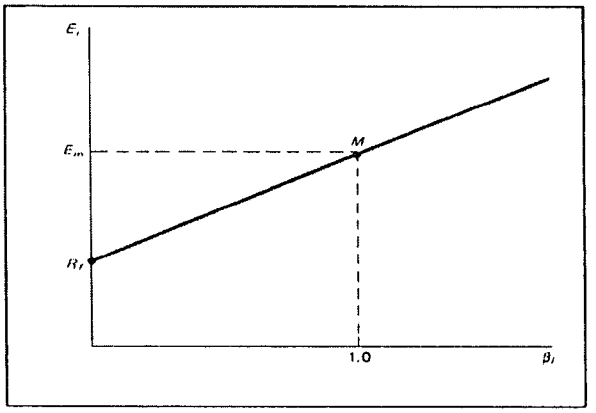
[19] Bloomberg.com, 1/2/10.

[20] Back in 1982, the cost of long-term treasury bonds briefly exceeded 14%, and the interest rate on even investment-grade corporate bonds was higher yet. At that time, it is possible that investors were sufficiently uncertain as to what future inflation rates would be that the cost of equity for some companies might have dipped below their cost of fixed rate long-term debt.

[21] P. BERNSTEIN, *Capital Ideas* at 86(Free Press © 1992).

[22] W. SHARPE, *Investments* at 161 (Prentice-Hall, Inc. 3d ed.© 1985,1981,1978).

FIGURE 7-3
The Security Market Line



Capital Asset Pricing Models

In the above graph, the "x" axis is the measure of risk quantified by the "beta" of a security and the "y" axis is the investor's expected return.

Dr. Sharpe further states:

> How does the equilibrium relationship shown by the Security Market Line come about? Through the combined effects of investors' adjustments in holdings and the resultant pressures on security prices. Given a set of security prices, investors calculate expected returns and security covariances, then determine desired (optimal) portfolios. If the amount off a security collectively desired differs from the amount available, there will be upward or downward pressure on its price. Given a new set of prices, investors will reassess their desires for various securities. The process will continue until investors' quantity adjustments do not require further marketwide price adjustments.[23]

Q. WHAT IS BETA?

A. Beta is a number that reflects how risky an investment in a particular company is in relation to a risk in a broad-based index such as the S&P 500. A company with a beta

[23] *Id.* at 161-62.

of 1.0 is, on average, expected to move up or down the same percentage as the broad index against which the beta computation is based. A company with a beta of 1.5 is expected to, on average, move up 50% more than the percentage change in the broad index in up periods, and move down 50% more than the broad index in down periods: i.e., if the market moves up 10%, companies with a beta of 1.5 are expected to move up by 15%. Conversely, a company with a beta of 0.75 is expected to move up only 75% as fast as the broad index in up periods, and down only 75% as fast over down periods: i.e., if the market moves up 10%, companies with a beta of .75 should be expected to go up by 7.5%. It is appropriate to consider beta as a measure of the risk of a diversified portfolio of stocks, with the beta of the portfolio being a measure of the cost-of-equity proportional risk of that portfolio.

Beta is commonly quantified by regressing the historic percentage change in a specific company's risk against the percentage change in a broad index over the same period. A historically computed beta can be inaccurate, especially if the company's characteristics have changed. Important changes include changes to the capital structure, the kind of businesses a company owns, and large relative changes in the size of the various businesses a company may own. For these reasons, professional investors sometimes use theoretical betas instead of historically determined betas.

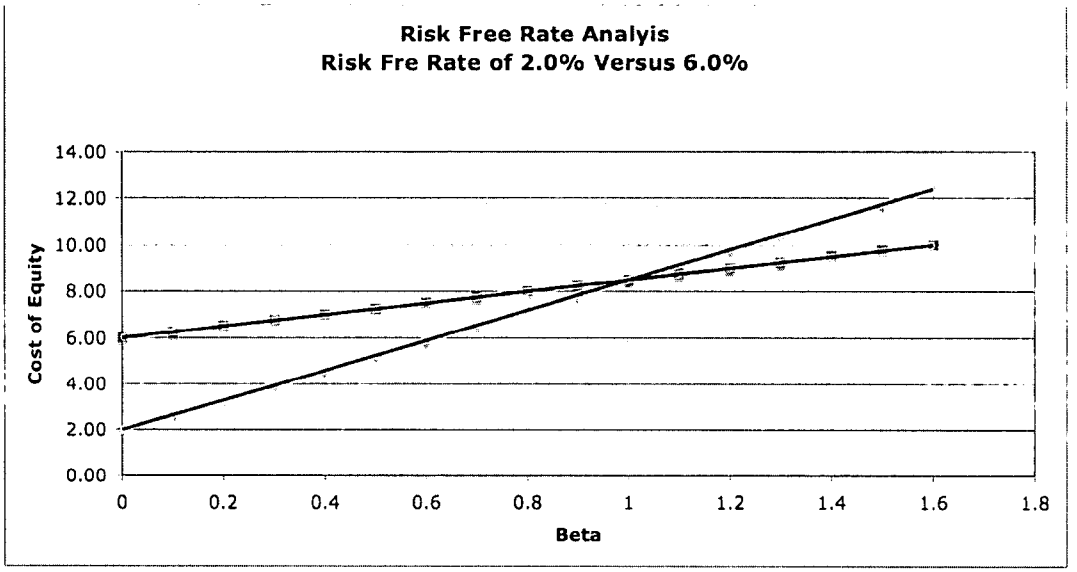
Historical betas computed by Value Line are commonly used in public utility rate proceedings. See JAR Appendix A to see how Value Line says it calculates beta.

Q. WHEN IMPLEMENTING THE TRADITIONAL CAPM, HOW SHOULD THE RISK-FREE RATE OF INTEREST APPROPRIATE FOR USE IN DEVELOPING THE SML BE DETERMINED?

A. One should use the risk-free interest rate that best fits with the requirement of the SML construct of the CAPM. Note that the SML graph depicts a straight line from the data point indicated by where the beta is zero and connects to the point where the beta is 1.0. The expected beta for a risk-free investment is zero. A beta of 1.0 is consistent with a security having a risk that is exactly the average of the group against which betas were determined.

Q. WHAT HAPPENS IF A RISK-FREE RATE THAT IS HIGHER THAN APPROPRIATE IS USED?

A. As illustrated in the following graph, if one uses a risk-free rate that is too high, the "slope" of the SML flattens out. Flattening out is bad because, as the graph shows, it causes the cost of equity for companies with a beta below 1.0 to be overstated and



causes the cost of equity for companies with a beta above 1.0 to be understated.

Investments with a below average risk are expected to be found along the SML somewhere between the zero point and the point depicted by the return with a beta of 1.0.

The appropriate risk-free rate to develop depends upon how that rate is going to be used. When applying the CAPM method, the risk-free rate should be one that can best explain changes in the cost of equity based on differences in beta between various groups that may be the subject of the CAPM computations. Within this context, the best risk-free rate to use is the current normalized interest rate on short-term treasury bills.[24]

Q. HAVE YOU SEEN ATTEMPTS TO IMPLEMENT THE CAPM BY USING AN UNADJUSTED LONG-TERM INTEREST RATE ON U.S. TREASURY BONDS AS THE RISK-FREE RATE?

A. Unfortunately, yes, this is a common mistake. This is unacceptable unless the purpose is to estimate the cost of equity for a company(ies) with a beta of 1.0.

For anyone who doubts that a long-term treasury bond has risk, consider the following. Which investment is lower risk: one that involves taking a sum of money and using it to purchase one-year treasury bonds each year for 20 years, or taking the same money and investing it all in one 20-year treasury bond? The series of one-year bonds is considerably lower in risk from the perspective of protecting the purchasing power of the investment because if inflation is high, the interest will go up during the 20-year investment horizon. Contrast this to the single fixed investment for 20 years. In this second case, if interest rates and inflation were to accelerate over the 20 years, the purchasing power of the remaining investment could be substantially worse than in the case of the 20 different one-year treasury bill investments.

Q. ARE YOU AWARE OF THE JUSTIFICATIONS FOR USING A LONG-TERM TREASURY BOND AS THE RISK-FREE RATE?

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[24] I am aware that prior cost of capital witnesses testifying for Staff have testified that use of a long-term treasury bond interest rate is the appropriate interest rate to use for the risk-free rate component of the CAPM. For the reasons I will discuss subsequently, however, I believe there is a superior approach that takes best advantage of the strengths of the long-term rate and the strengths of the short-term rate.

A. Yes. The two reasons I have seen given are that: (1) the maturity of a long-term bond is closer to the maturity of common stock; and (2) the short-term treasury bill rate is too volatile.

Q. WHAT IS YOUR RESPONSE?

A. The first reason is based on faulty logic. While it is true that common stock does not have a maturity date and therefore has a closer maturity to a long-term bond than a short-term bond, this has no bearing on how the risk-free rate is being used in the CAPM. In the traditional CAPM, the risk-free rate is used as one of the two points that establish the SML. This is correct whether a graphical solution or the CAPM formula is being used. A formula is a mathematical way of determining the same answer and using the same approach as if the graphical solution were employed. Either way, the risk-free rate is being used specifically and totally to determine the slope. If the correct short-term debt rate is used, the slope is steeper than if the long-term debt rate is used, but the cost of equity for a company of average risk is not changed. Therefore, whether to use the cost of long-term debt or the cost of short-term debt as the risk-free rate does not influence the cost of equity for a company of average risk. All it does is influence how much the cost of equity changes in response to a change in risk.

As for the contention that the short-term debt rate is too volatile, there is a standard and very reasonable way to solve the problem: determine the normalized short-term debt rate. This is done by subtracting the average difference between short-term treasury bills and long-term treasury bonds ("the maturity premium") from the long-term debt rate, where the maturity premium is equal to the average difference between the return on long-term treasuries and the return on short-term treasuries . In this way, the

short-term debt rate experiences the same exact basis point swing as the long-term debt rate, but the risk-free rate has properly excluded the maturity premium.

Q. SHOULD THE COST OF EQUITY INCLUDE A MATURITY PREMIUM?

A. Maturity for debt is very different than maturity for equity because the interest rate on debt is fixed while the return on equity varies. When either the actual earned returns earned by common equity investments is determined (as is commonly done when implementing the CAPM method) or the cost of equity is determined by a properly applied DCF method, the maturity premium either earned or demanded by equity investors is already included in the equity cost computation. In the CAPM, the maturity premium must be excluded from the risk-free debt cost but included in the risk premium because the maturity premium component of the cost of equity is part of the risk premium that varies with beta. When the maturity premium is excluded from what is used as the risk-free rate, changes in beta have a greater impact on the CAPM-measured cost of equity: it is proportionally lower for companies/portfolios with a beta below 1.0, and proportionally higher for companies/portfolios with a beta above 1.0.

Q. IS THE NORMALIZED INTEREST RATE ON SHORT-TERM TREASURY BILLS DIFFERENT THAN THE CURRENT ACTUAL INTEREST RATE ON SHORT-TERM TREASURY BILLS?

A. Yes. The Federal Reserve uses short-term interest rates as a tool to provide some degree of control over economic conditions. This control creates short-term interest rates that can be substantially artificial at any one point in time. Also, when investors are especially concerned about safety, the demand for short-term treasuries may become unusually large, further pushing down the short-term rate. This is why it is preferable to

estimate a normal short-term interest rate by subtracting the maturity premium from the current interest rate on long-term treasury bonds.

From 1926-2008, the maturity premium between short-term treasury bills and 20-year U.S. treasury bonds averaged 2%.[25] Although it is regarded as virtually certain that investors will be paid the dollars that are contractually due on exactly the date that they are due for both short-term U.S. treasury bills and U.S. treasury bonds, it is never certain what purchasing power those dollars will have. Very short-term treasury bills have minimal risk of change in the purchasing power of a dollar because the shorter the time period, the less likely there will be any change in the purchasing power of the dollar. Long-term U.S. treasury bonds are generally not as subject to the same extreme market distortions as short-term treasury bills, but they are not truly risk-free investments because they contain a maturity premium risk, or a "horizon premium" as it is called on page 74 of the *Yearbook*.

Q. HOW SHOULD THE RISK-FREE RATE OF INTEREST TO BE USED IN THE CAPM METHOD BE DETERMINED?

A. A reasonable place to start is the risk-free interest rate developed by determining the average return on short-term U.S. treasury bonds over a long enough period of time to sufficiently average times of economic stimulus with times of economic damping. However, because the actual risk-free rate over an historical time period includes an allowance for the inflation expected for that time period while the true normalized risk-free rate for the current time depends on current inflation expectations, some adjustment to the historical risk premium number is required.

[25] *Ibbotson "SBBI" 2009 Classic Yearbook* at 32 (difference between 5.7% for long-term government bonds and 3.7% for U.S. treasury bills).

Q. DO INVESTORS WHO BUY A LONG-TERM TREASURY BOND WHEN IT IS ISSUED AND HOLD IT TO MATURITY STILL EXPERIENCE RISK ON THIS INVESTMENT?

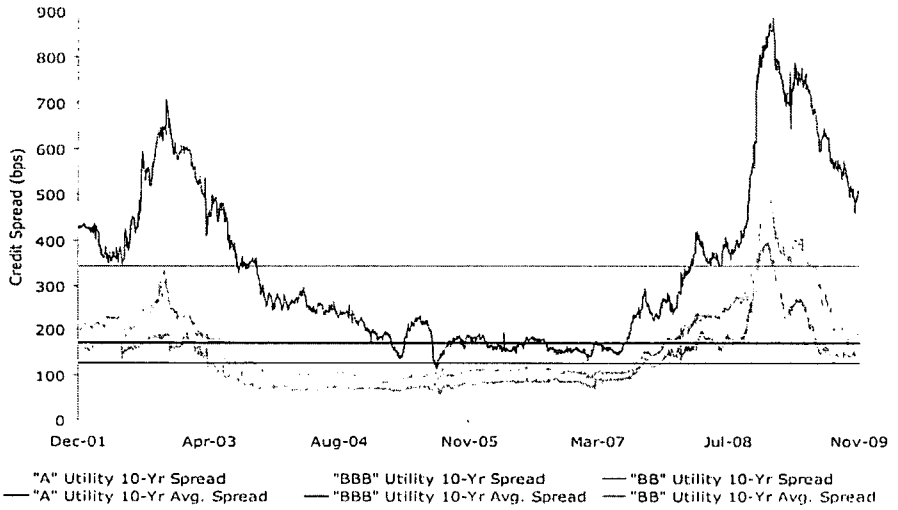
A. Yes. Investors might be able to predict with certainty when and how much the payments will be over the next thirty years, but they will *not* know what the purchasing power of the future stream of payments will be, or what the opportunity cost would have been if the same treasury bond had been purchased later. This makes the rate on long-term treasury bonds inadequate as a quantifier of the risk-free interest rate.

Q. ARE FINANCIAL CONDITIONS THE SAME TODAY AS THEY WERE ON AVERAGE BETWEEN 1926-2008?

A. No. While there are many differences, one must consider the impact of the Great Recession when applying debt-based methods in the current financial environment.

In times of financial strife, investors can respond by becoming more risk averse. This risk aversion can become extreme when fear of bad economic times elevates sufficiently. One demonstration of this extreme is the graph prepared by Wells Fargo (provided by Delmarva in response to PSC-COC-5).

Historical Utility Credit Spreads



WELLS FARGO

1

This graph shows several important facts. First, the spreads for all three ratings briefly, but significantly, exceeded the average spread during 2002. 2002 was a time of turmoil in the financial markets that is often called the "tech wreck." These spreads returned to normal in less than a year and were followed by a sustained period where the risk premium was below normal. Second, the risk premium widened suddenly and substantially starting in 2008 and briefly reached an extreme before heading back towards normal. As of November 2009, the premium on BB-rated bonds was still materially higher than normal but appeared to be coming back down. This recent peak is no doubt investor reaction to the Great Recession of 2008-09. Third, the degree of spread increased as the bond rating category decreased, with the lowest-rated BB bonds seeing a much larger increase in the spread than the other categories. Note that as of the time the graph was prepared, the interest rate spread on A- and BBB-rated bonds had come close to returning to normal, but the spread on BB-rated bonds was still considerably above its historical average.

Q. IS THE OBSERVED INCREASE IN SPREADS FOR THE LOWER RATED BONDS A LOGICAL RESPONSE ON THE PART OF INVESTORS?

A. Yes. Lower rated companies have weaker businesses and/or weaker balance sheets, so they become more vulnerable during times of general economic weakness.

Q. DOES THIS OBSERVED INCREASE IN THE RISK PREMIUM HAVE ANY IMPLICATIONS FOR THE RISK PREMIUM APPLICABLE TO EQUITY?

A. It could. In November 2009, the daily average of the interest rate on 10-year treasury bonds was 3.39%.[26] The graph shows that the spread over 10-year treasury

[26] Obtained by taking a daily average of the 10-year treasury bond interest rates as reported on the U.S. Federal Reserve's website.

bonds as of November 2009 was about 5.25%. Adding this 5.25% to the 3.39% produces an interest rate of 8.64% on BB-rated bonds. This is somewhat less than the cost of equity indicated by the DCF method, so it is reasonable to estimate that in the current marketplace the increase to the risk premium applicable to a common stock investment caused by the Great Recession could be somewhat higher than the spread applicable to BB-rated bonds.

Q. GIVEN YOUR EXPLANATIONS, HOW DID YOU IMPLEMENT THE TRADITIONAL CAPM METHOD?

A. As shown on Schedule JAR-8, page 3, I started with the 9.6%[27] compound (or geometric) actual return earned by the average industrial company from 1926-2008 as reported in the *Yearbook*. I then determined that the average risk premium over 1926-2008 was 5.9% (9.6% compound annual (geometric) average return on common stocks minus the 3.7%[28] compound annual (geometric) average return on short-term U.S. treasury bills). I then multiplied the average risk premium over 1926-2008 by a beta of 0.72[29] to arrive at a risk premium of 4.26% over the cost of short-term debt for Delmarva. I then adjusted the historically indicated risk premium upward by 1.07% to account for both a net average decrease in the risk free rate of 0.74% and a net increase of 1.80% due to financial conditions caused by the Great Recession. See Schedule JAR 8, Page 2.

As shown on Schedule JAR 8, Page 1, the result is a traditional CAPM-indicated cost of equity of 9.12%.

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[27] *Ibbotson SBBI 2009 Classic Yearbook*, page 239.
[28] *Ibbotson SBBI 2009 Classic Yearbook*, page 269.
[29] JAR Schedule 3, page 3.

2. MARKET-DERIVED CAPM

Q. IS IT POSSIBLE TO KNOW WHAT TOTAL RETURN INVESTORS EXPECT FOR A PORTFOLIO WITH A SPECIFIC BETA?

A. No, but there are ways to produce a reasonable estimate. The actual earned return achieved by the S&P 500 industrial companies from 1926 to date can be obtained from the *Yearbook*, but it is not possible to know the extent to which the actual returns achieved in aggregate from 1926-2008 reflect what investors expect for the future.

Some people rely heavily on the historical actual earned returns from 1926-2008 with an expression of strong confidence because of a belief in the reversion to the mean principle. This is an oversimplification. In 1926, the United States was still in the industrial revolution. Since then, World War II occurred, followed by the semiconductor age, the internet, and globalization. Each of these factors was both significant and unique. Nobody knows what will occur in the future, or what it will mean as world economies mature.

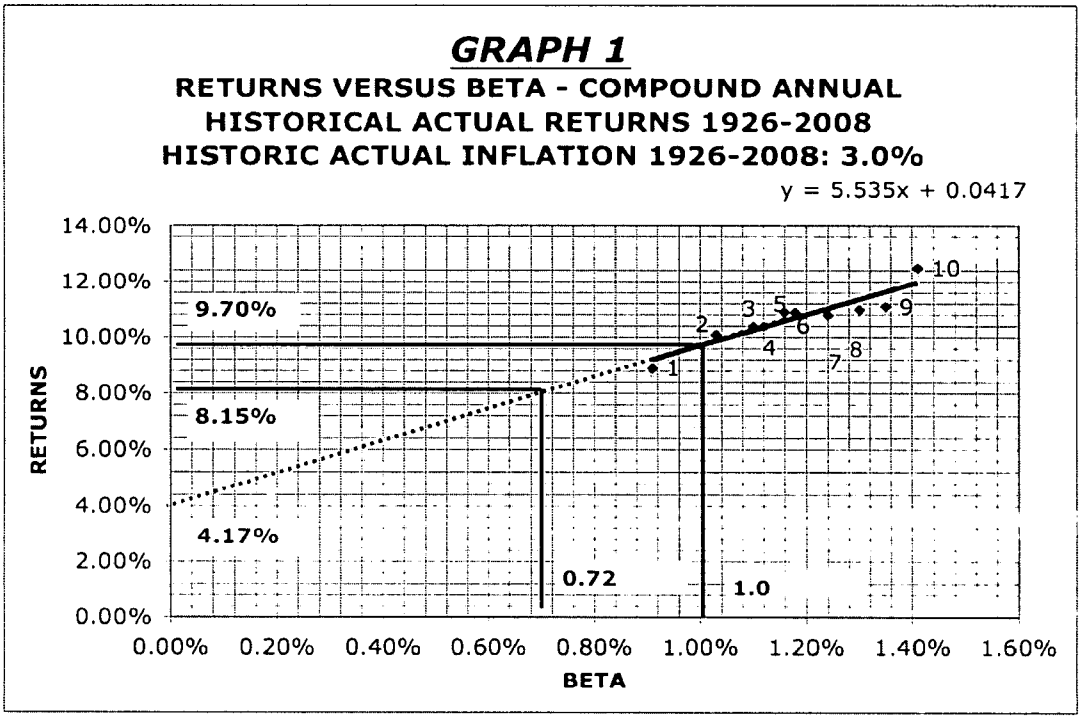
It could theoretically be possible to compute what investors expect as the return on common stock investments by applying the DCF method to the S&P 500. While this could be reasonable if the DCF method were applied correctly, to the extent the purpose of applying the CAPM method is to use it as either a check on or reinforcement of a DCF method, then using the DCF method as an element in the CAPM method would defeat that intent. For example, if a person were using a defective DCF method when applying the DCF method initially, those defects would carry over to the CAPM, thereby creating the illusion that what appeared to be a confirmation was nothing but the same mistake in a different package.

Q. HOW SHOULD THE MARKET-DERIVED CAPM BE IMPLEMENTED?

A. Data is available to compute the actual historical relationship between the earned return on equity and the beta for ten different portfolios. This provides a solid starting point, but the unadjusted result should not be used. It is important to consider the following. First, the allowance for inflation demanded by investors over the historical period could be materially different today. Since the total return demanded by investors includes the risk-free rate, an allowance for inflation, and an allowance for risk, differences in investors' expectations for inflation between the historical period and today must be considered. Second, the risk premium investors demand for any given beta may not be the same today as it was on average over the historical period.

Q. DID YOU DEVELOP AN SML SHOWING THE HISTORICAL RELATIONSHIP BETWEEN BETA AND THE ACTUAL TOTAL RETURN ACHIEVED BY INVESTORS?

A. Yes. The following shows how beta has related to historical actual returns over the time period from 1926-2008:



Points numbered 1 through 10 are actual data. The solid line is the least-squares best fit line through the data. The dotted line is the straight line continuation of the actual least-squares line.

Q. IN THE ABOVE GRAPH, HOW WERE THE HISTORIC ACTUAL RETURNS COMPUTED?

A. I used the compound annual (geometric) returns achieved by each group of companies from 1926-2008. I obtained the actual returns and the groups from page 106 of the *Yearbook*.

Q. DO THE HISTORICAL ACTUAL RETURNS FROM 1926-2008 NECESSARILY REPRESENT WHAT INVESTORS EXPECT FUTURE RETURNS TO BE?

A. No, but looking at such returns can provide a helpful comparison to a more purely forward-looking DCF method. The theory behind looking at earned returns over a long period of time is that *if* returns gravitate to a central mean, then the returns achieved over a long period of time will provide guidance.

Q. ARE THE *YEARBOOK'S* COMPUTATIONS BASED ON AN EXPECTATION THAT ALL ASPECTS OF THE HISTORICAL EARNED RETURN SHOULD BE EXPECTED TO GRAVITATE BACK TO THE MEAN?

A. No. The *Yearbook* opines that the portion of the historical returns that resulted from the expansion of P/E ratios is not repeatable and should be adjusted out of the numbers. It makes no other adjustments; therefore. everything else (including interest rates and inflation) is modeled to revert back to the mean.[30] To correct the 1926-2008 for P/E ratio creep, the 9.60% geometric return on all common stocks became 9%.

Q. HOW IS THE COMPOUND ANNUAL (GEOMETRIC) AVERAGE COMPUTED?

[30] *Ibbotson SBBI 2009 Classic Yearbook*, pages 144-145.

A. The compound annual (geometric) return is computed by finding the overall compound annual return an investor would have to earn for the starting value of the investment to grow to the ending value of the investment. For example, if an investor made a $1,000 investment ten years ago that is worth $2,400 today, such an investment would have earned 9.15% per year.[31] What happened to the investment in the intervening years is irrelevant: irrespective of what happened in between, the investor still ended up with the same $2,400.

Q. HOW IS THE ARITHMETIC AVERAGE OF ANNUAL RETURNS COMPUTED?

A. The arithmetic average of annual returns is computed by determining the percentage gain or loss in each year. Then, an average of each of those annual percentage gains or losses is computed.

Q. DO COST OF CAPITAL WITNESSES AGREE ON WHETHER TO USE THE ARITHMETIC OR THE GEOMETRIC AVERAGE WHEN QUANTIFYING HISTORICAL RETURNS?

A. No, but it can make a big difference. Some use the arithmetic average; others use the geometric average; others use a mix of both. The arithmetic average for computing historical returns is so confusing to many (and so useful to those who subconsciously or otherwise want to overstate returns) that it simply won't go away. I have even seen on occasion mostly good textbooks give amazingly flawed examples purporting to support the arithmetic average.

Q. CAN YOU PROVIDE A REAL-WORLD EXAMPLE OF THE IMPACT OF USING THE ARITHMETIC VERSUS THEGEOMETRIC AVERAGE?

[31] (2,400/1,000)^.1=9.15%

A. Yes, and this example should end this debate once and for all. Assume that you have worked very hard for many years, saved your money, sold your house and now have $1,000,000 cash as your total life savings. Before heading off on your dream voyage around the world, you are faced with a choice between two investments, and must put all of it in either one:

> **INVESTMENT A**: Put the entire $1 million in an investment that, in 2 years will produce an arithmetic return of an average of no less than 50% per year.
>
> **INVESTMENT B**: Put the entire amount in an investment that will earn a geometric return of no less than 8% per year for the two years.

Which would you choose? If the arithmetic average return was actually a goal investors should seek, then the prospect of at least a 50% return is very exciting indeed - especially if the alternative is a more down-to-earth 8% return. The thought of returns in excess of 50% creates fantasies of the $1 million growing to an amazing number. But frankly, only a fool would choose investment A. Here's why:

> **Investor A** could satisfy his requirement by investing $999,998 with Bernard Madoff, and $2.00 in cash in Year 1. After the first year, the $999,998 is worth zero, and the cash is still worth $2.00. Net investment value after year 1: $2.00. Arithmetic return in the first year is –(100)% after a tiny rounding error. In year 2,the $2.00 cash is used to buy a ticket on a racehorse that wins, returning $7.00 for the $2.00. Gain in the second year: (($7/$2)-1)/$2=2.5, or 250%. Average the (100)% return for year one with the +250% return for the second year, and the arithmetic average return is 125% per year (0%+250%)/2, substantially beating the 50% promised minimum return. But that hard-earned $1 million is now worth only $7.00.
>
> **Investor B** could meet his requirement by investing the entire $1 million in an S&P 500 index fund in Year 1. The fund hits a rocky year, and declines in value to $900,000. First year return, -(10)%. The second year is much better, and the fund increases in value from $900,000 to $1,170,000. The geometric return is a bit

> more complicated to compute, but it is ($1,170,000/$1,000,000)^2-1=8.17% - producing a very nice profit of $170,000. . Note that because the geometric average focuses on the end result, by the rules established for Investment B, the minimum amount the account could be worth in 2 years is $1,166,400 ($1 million x $(1.08)^2$), irrespective of what the investment is worth in-between. While many routes exist that would produce an 8% or more annual geometric return over two years than the one in this example, *none* would have a total account value less than $1,166,400 at the end of the two years.

Investor A would receive truthful reports of having earned a return over 50%, only to return home to find that he is broke. If a way of computing return on investment is capable of producing as misleading a result as the arithmetic averaging approach did in the above potentially real world example, how could any serious investor rely on it for reporting return on investment? Sure, the arithmetic average of annual returns is properly useful for computing the standard deviation of annual returns and can therefore be useful for estimating risk, but for estimating the outcome of a future investment opportunity the arithmetic average **does not tell you what return has been or will be earned in periods longer than one year.**

The arithmetic average approach produces such a highly misleading result because it fails to scale the investment by size; instead, it starts over in each year. Investor A ends up with the result that he did because the investment that lost almost 100% was $1 million, while the investment that returned 250% was only $2.00 - yet, the arithmetic average approach weights the -100% and the +250% equally. While this example might be an extreme case that intentionally flaunts this embedded error, exactly the same flaw exists when using the arithmetic average as a tool to measure return over ranges more typically found on a diversified portfolio of U.S. common stocks.

Contrast this to the geometric return. If Investor B received truthful information that the two-year geometric return on his investment was 8% per year, he can arrive home confident about how much money he still has.

Q. IS THERE A MATHEMATICALLY DEFINABLE RELATIONSHIP BETWEEN THE COMPOUND ANNUAL (GEOMETRIC) RESULT AND THE ARITHMETIC AVERAGE RESULT?

A. Yes. The *Yearbook* shows that the compound annual (geometric) average and the arithmetic average of the return are related by the standard deviation of the returns.[32] Following is the equation that defines the relationship:

$$R_A = R_G + \sigma^2 / 2$$

Where
R_A= the arithmetic average;
R_G= the geometric average;
σ = the standard deviation of equity returns.

Standard deviation is a routinely used statistic that is computed based upon the variability of the annual data. If one knows the arithmetic average and the standard deviation, it is possible to accurately compute the geometric average. Conversely, if one knows the geometric average and the standard deviation, it is possible to accurately compute the arithmetic average.

The standard deviation of the annual returns on stock is related to stock price volatility. If, for example, a utility company with a dividend yield of 5% had a growth rate of 4% and a cost of equity of 9%, this would mean that the company would be expected to both pay the 5% dividend and have its stock price grow at 4% per year. If, indeed, the stock price did grow at 4% per year and dividends kept pace with the stock

[32] *Ibbotson SBBI 2009 Classic Yearbook*, page 145.

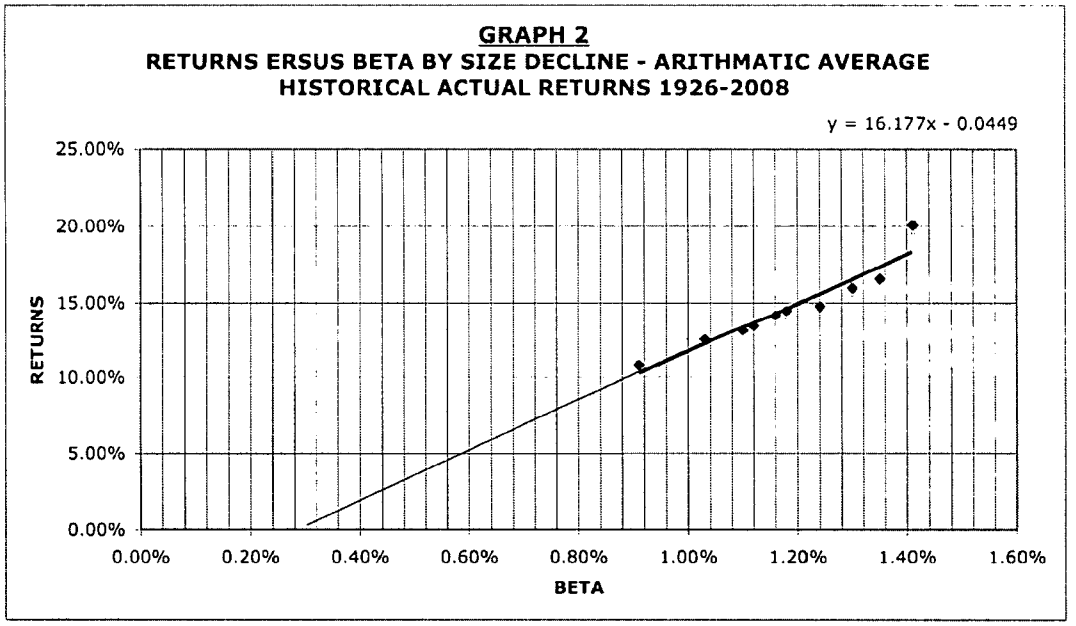
price growth such that the dividend yield stayed at 5%, the standard deviation would be 0%. As can be seen from the relationship defined in the above equation, when the standard deviation is 0%, the arithmetic mean and the geometric mean are identical. The standard deviation changes and the arithmetic mean changes only when the stock price fluctuates such that in some years stock price growth is more than 4% and in other years the growth is less than 4% even though the company was allowed to and might actually be earning 9% per year. The larger the annual fluctuations in stock price up and down, the larger the standard deviation and the larger the arithmetic mean return even if the earned return on book equity remains at the allowed 9% throughout.

Therefore, what makes the arithmetic mean return get higher and higher has nothing to do with the allowed return on equity but instead has everything to do with the stock price volatility. This means that the correct return to allow as the cost of equity to a utility is the compound annual geometric return. To the extent an investor might be counting on the opportunity to do better or worse than the allowed return based upon arithmetic mean computations, that difference will be take care of by the normal forces that cause the stock price to fluctuate and have nothing whatsoever to do with the return rate that should be allowed on the company's rate base investment.

Q. EARLIER, YOU PRESENTED A GRAPH THAT SHOWED THE ACTUAL RELATIONSHIP BETWEEN THE EARNED RETURN AND BETA WITH THE EARNED RETURN COMPUTED USING THE COMPOUND ANNUAL (GEOMETRIC) RETURNS. HOW DO THOSE RESULTS COMPARE TO THE RETURNS BASED ON ARITHMETIC RETURNS?

A. The following graph shows earned returns versus beta using the arithmetic average of annual returns. Note that the results from the arithmetic average of annual returns are very strange in that if the line is continued to show what answer would be

produced for a riskless (zero beta) asset, the result is a negative 4.49%. Contrast this to the positive 4.17%[33] result based upon the compound annual (geometric) results shown on Graph #1 on page 56 of this testimony. This 4.17% that is within reasonable error tolerance of the positive 3.7%[34] actual earned return on short-term U.S. treasury bills from 1926-2008. This result reinforces the appropriateness of the compound annual (geometric) average.



Q. ARE THOSE WHO ATTEMPT TO USE THE ARITHMETIC AVERAGE OF ANNUAL RETURNS RATHER THAN THE COMPOUND ANNUAL (GEOMETRIC) RETURN AWARE OF THE OBVIOUSLY ERRONEOUS RESULT OBTAINED FOR THE RISK-FREE ASSET PREDICTED FROM THE EMPIRICAL COMPILATION OF THE EARNED RETURN DATA FOR THE GROUPS OF COMPANIES WITH DIFFERENT BETAS?

A. Yes. I have seen discussions in testimonies in public utility rate proceedings and in some financial literature suggesting that this result casts doubt on the basic hypothesis of the CAPM method that the required returns vary linearly with beta. These people

[33] See Schedule JAR, page 1
[34] *Ibbotson SBB" 2009 Classic Yearbook*, page 32

typically go on to suggest that the graph based upon the historical compilation of arithmetic returns means that there must be some risk characteristics for which investors receive compensation that are not captured by beta. Rather than recognizing that the flaw is not in the CAPM, but in the mathematical approach used to quantify the true historical actual returns, these people then propose adjustments to force the SML to behave in a way that forces it to bend towards a more realistic risk-free rate.

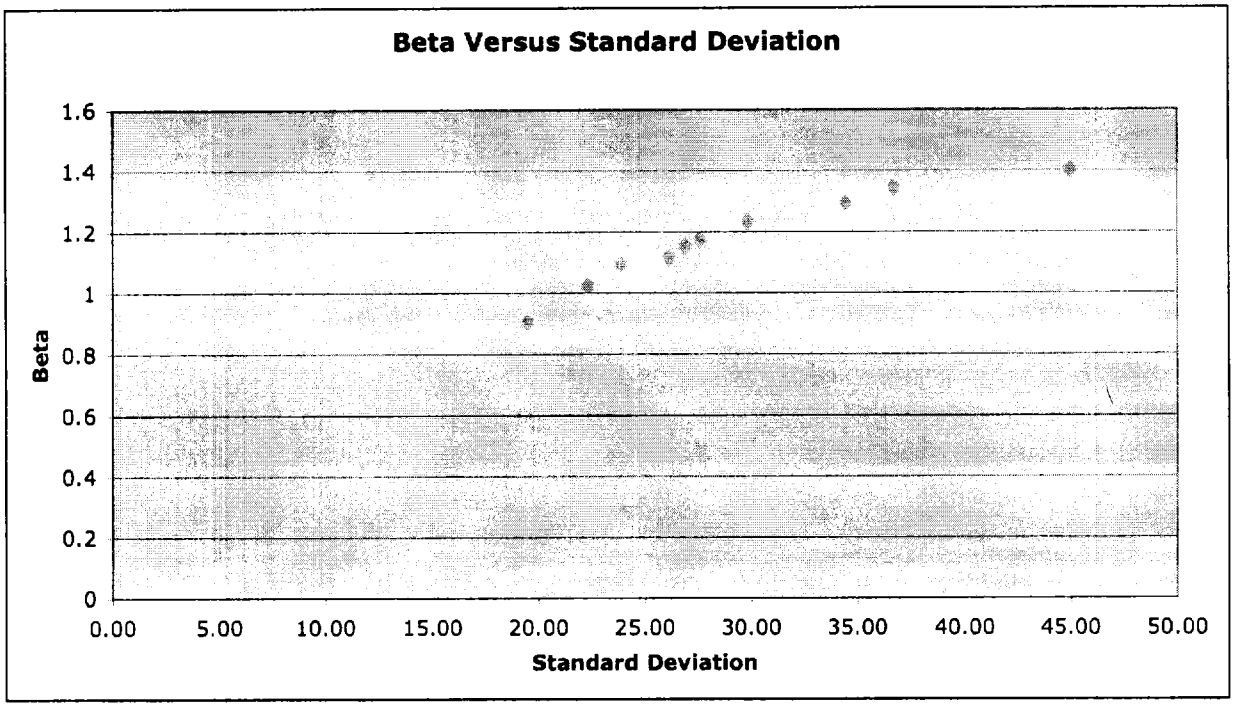
Q. SHOULD THOSE WHO HAVE GONE THROUGH THE CONTORTIONS THAT ATTEMPT TO "FIX" THE SML DERIVED FROM THE ARITHMETIC AVERAGE OF ANNUAL RETURNS KNOW BETTER?

A. Yes. As the *Yearbook* correctly states:

> ...the arithmetic mean returns are always higher than the geometric mean returns. The difference between these two means is related to the standard deviation, or variability, of the series.[35]

A review of the data on page 106 of the *Yearbook* (the source table for the graph showing both the geometric and arithmetic mean returns based on beta) shows that the standard deviation goes up as the beta goes up. The following graph shows the relationship between beta and standard deviation in the data presented on pages 106 and 115 of the *Yearbook*:

[35] *Id.*



Since the difference between the geometric and arithmetic means goes up as the standard deviation goes up, this difference goes up as beta goes up. What this shows is that the force that causes the extraordinarily severe slope of the arithmetic average-derived SML and produces an impossibly low-risk-free rate is caused by the predictable distortion of the arithmetic mean computational approach, *not* by any mysterious forces unexplainable by the CAPM method.

Q. IS THERE ANY LITERATURE THAT ADDRESSES THE ISSUE OF ARITHMETIC AVERAGE VERSUS GEOMETRIC AVERAGE?

A. Yes. I have included an article entitled "Fuzzy Math" that appeared in the October 8, 2003 edition of the Wall Street Journal as Appendix C. This article explains that the arithmetic average technique is a trick used to deceive unsuspecting investors into believing actual earned returns have been higher than they really are.

Appendix D is an article from Value Line entitled "Difference in Averaging," which explains that the arithmetic average method overstates actual returns while the geometric averaging method produces the correct return.

Q. IS THERE ANYTHING ELSE YOU WOULD LIKE TO SAY IN CASE ANY READERS ARE LEFT WHO STILL WANT TO BELIEVE IN THE FAIRY TALE USE OF THE ARITHMETIC MEAN?

A. Yes. Let me first repeat again the formula showing the relationship between the arithmetic average and the geometric average:

$$R_A = R_G + \sigma^2 / 2$$

Where
R_A = the arithmetic average;
R_G = the geometric average;
σ = the standard deviation of equity returns.

Note that the above formula shows that the ONLY difference between the arithmetic average and the geometric average is the standard deviation of equity returns. When the standard deviation is zero, then the $\sigma^2 / 2$ term is zero, so the arithmetic average equals the geometric average. For an equity investment, the standard deviation of the annual returns is zero if and only if the change in stock price change is exactly the same over every period it is measured. A company whose stock price grows at exactly 4% per year will have exactly the same growth whether the arithmetic or geometric average method is because standard deviation is merely a method to compute how variable the return is from year to year. **Here is why this simple irrefutable fact is in-and-of itself enough to prove that when the arithmetic average return is higher than the geometric return, the geometric return is the one we want for utility ratemaking:**

Assume a commission determines that the cost of equity for a company it regulates is 9% and set rates such that the company actually earns that 9% year after year. If that company were to be paying a dividend of 5% per year, growth in both stock price and dividend would be expected to be 4% per year. While such an outcome is

entirely plausible, the stock market being what it is, the actual annual growth in the stock price for this company would vary. Sometimes it would be more than 4% and sometimes the stock price would decline for the year even if the company actually earned the 9% return each and every year. Since the characteristics of the stock market are such that stock prices will fluctuate, when the earned return is precisely equal to a constant geometric return, stock market fluctuation will essentially always cause the cause the arithmetic return to be higher than the earned return. So, if there really were any investors seeking an arithmetic return, normal stock market fluctuations would cause them to earn the arithmetic return increment over the geometric return.

Based on the above, please recognize that since it is stock market fluctuations and not the allowed return on rate base that causes the standard deviation to climb, a company allowed a 9% cost of equity will, on an arithmetic average basis, earn more than 9% anyhow, with the increment above the 9% coming from stock market movement rather than from the allowed return component.

Q. ARE YOU SAYING THAT BECAUSE OF STOCK MARKET MOVEMENT, INVESTORS WILL EARN MORE THAN THE ALLOWED RETURN?

A. No. The geometric average method is the correct way to look at the total return. However, if there is an investor who wants to focus on the arithmetic return instead of the geometric return, in the eyes of this investor the higher arithmetic returns will still be there because the stock market fluctuations will still occur.

Q. GIVEN YOUR ABOVE EXPLANATIONS, HOW DID YOU IMPLEMENT THE MARKET-DERIVED CAPM METHOD?

A. I implemented the market-derived CAPM method by:

a. Graphing the actual data available in the 2009 edition of the *Yearbook* which shows actual earned returns from 1926 to 2008, along with the betas for each of 10 groups of companies. The historical return data is available both as a compound annual (geometric) return and as an arithmetic return. For reasons explained in this testimony, my conclusions are based on the compound annual returns.

b. Using the SML graph to solve for the 1926-2008 average cost of equity based on a beta of 0.72 applicable to Delmarva; and

c. Increasing the historically indicated risk premium by a net 1.05% to account for both a net average decrease in the risk-free rate of 0.75% and a net increase of 1.80% because of a higher current risk premium due to financial conditions caused by the Great Recession. See Schedule JAR 8, Page 2.

Q. DOES THE *YEARBOOK* SPECIFY THE RETURN IT BELIEVES INVESTORS CAN EXPECT TO EARN ON AN INVESTMENT IN LARGE STOCKS IN THE FUTURE?

A. Yes. It concludes that large stocks "...will continue to provide significant returns over the long run, averaging around 9.00 percent per year, assuming historical inflation rates."[36]

Q. HOW WAS THIS 9% DEVELOPED?

A. Page 144 of the *Yearbook* presents historical data from 1926-2008 showing that the P/E ratio for large common stocks increased at the rate of 0.6% per year. This 0.6% was subtracted from the compound annual (geometric) average return of 9.6% "... because it is not believed that P/E ratios will continue to increase in the future. The market serves as the cue. The current P/E ratio is the market's best guess for the future of corporate earnings and there is no reason to believe, at this time, that the market will change its mind."

Q. HOW DOES THIS 9% EXPECTED FUTURE ANNUAL RETURN ON LARGE COMMON STOCKS RELATE TO WHAT IN AGGREGATE THE

[36] *Id.* at 144-45.

YEARBOOK SAYS ITS DATA MEANS ABOUT DELMARCA'S COST OF EQUITY?

A. The *Yearbook* interprets its data to mean that investors first recognize that the 9.6% historical compound annual (geometric) mean return is the appropriate starting point for the future expected return on equity computation. Then it makes a downward adjustment to offset the unsustainable historical increase in the P/E ratio. Since the Yearbook (Chapter 7) recognizes that beta influences the cost of equity, it is appropriate to conclude that since the average beta for the electric companies comparable to Delmarva is less than 1, the cost of equity to Delmarva consistent with the 9% future expected return finding has got to be something less than 9%, although the exact amount of the downward adjustment is not specified. This means that if one assumes, as the *Yearbook* does,[37] that the future allowance for inflation demanded by investors will be the same in the future as it was in the past, the correct interpretation of the *Yearbook's* historical data is that the cost of equity to Delmarva is less than 9%.

Q. HOW DO INVESTORS' CURRENT EXPECTATIONS FOR INFLATION COMPARE TO THE HISTORICAL ACTUAL RATE OF INFLATION?

A. According to the *Yearbook*,[38] the historical actual inflation rate was 3% per year. A comparison of the interest rate on long-term treasury bonds that make non-inflation-adjusted payments with long-term treasury bonds that are adjusted for inflation shows that the current expectation for inflation is 2.60%,[39] which is 0.40% lower than the 3% historical actual inflation rate.

Q. IF THE CURRENT EXPECTED THE INFLATION RATE IS LESS THAN THE HISTORICAL RATE, HOW WOULD CONSIDERATION OF THIS

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[37] *Id.* at 145.
[38] *Id.* at 32.
[39] See JAR Schedule 8, Page 2

IMPACT THE 9% COST OF EQUITY RESULT OBTAINED IN THE *YEARBOOK*?

A. To obtain its 9% cost of equity, the *Yearbook* assumes that the only required adjustment to the historical numbers is for the unsustainable increasing trend in the P/E ratio. It assumes all other factors, including inflation and the risk premium, will revert back to the mean. The difference is that I have used current investors' expectations for inflation and the risk premium rather than assume reversion to the mean. As a practical matter, in the current environment the 0.75% average reduction in inflation expectations and the average increase for the Great Recession risk premium of 1.80% result in a 1.05% net increase in the historically determined CAPM result. See Schedule JAR 8, Page 2. After adjusting for the beta of 0.72, my average CAPM result is 9.12%. This result, while only slightly higher than the *Yearbook*, is more than ten basis points higher than the *Yearbook* result after adjusting to account for the lower beta of the comparative group of electric and gas utilities

D. ALLOWED RETURN ENVIRONMENT

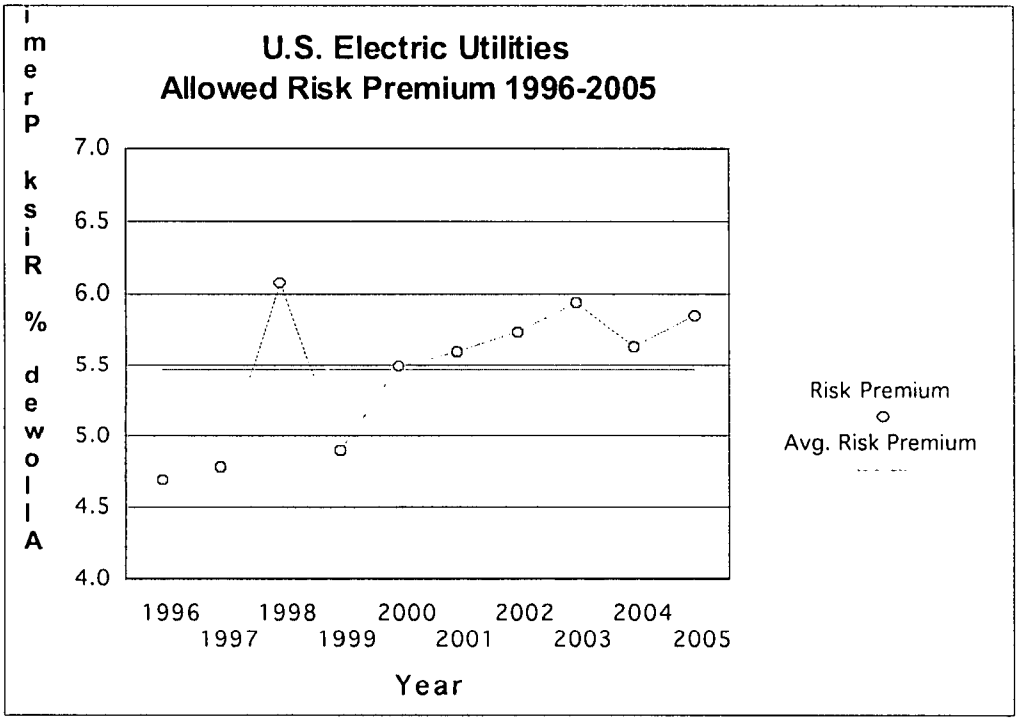
Q. IS IT APPROPRIATE FOR UTILITY COMMISSIONS TO DETERMINE THE COST OF EQUITY BY SIMPLY COMING UP WITH AN ALLOWED RETURN THAT IS IN ALIGNMENT WITH WHAT OTHER COMMISSIONS ARE ALLOWING?

A. No. While I have often this raised in rate proceedings, allowing a cost of equity based on what other commissions have allowed is dangerously circular. Think of what happens if one commission peeks at what another commission allowed if all that commission did was to look at what another commission did. One commission looks at another who looked at another, etc. The more that this happens, the more the allowed

return on equity gets stuck in a rut. The result is that allowed returns can in general stay too high or too low for many years.

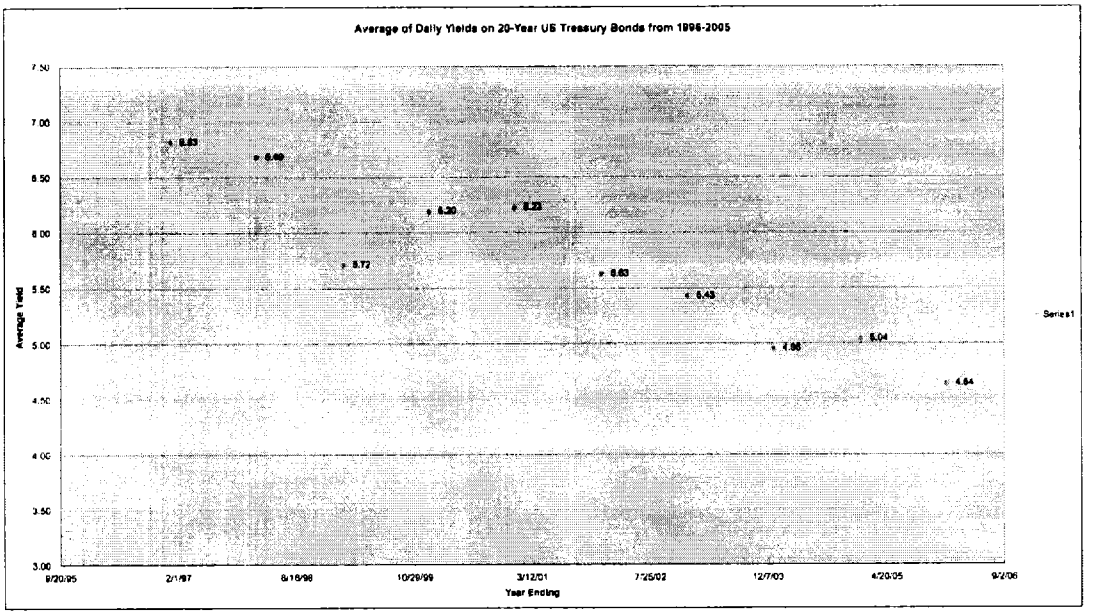
Q. IS THERE EVIDENCE THAT ALLOWED RETURNS HAVE FAILED TO RESPOND RAPIDLY ENOUGH TO CHANGES IN INTEREST RATES?

A. Yes. The following graph appeared on page 36 of Dr. Morin's direct testimony in the 2005 Delmarva rate proceeding (provided in response to PSC- COC-3):



This shows that at least since 1996: (1) the risk premium allowed by utility commissions has been trending up, increasing by about 1.2% between 1996 and 2005; and (2) over this same time period, the interest rate on long-term treasury bonds declined by 2.19%, from an annual average of 6.83% in 1996 to 4.64% in 2005:[40]

[40] The data to prepare the average interest rate on 20-year treasury bonds was downloaded from the U.S. Federal Reserve's website. The daily yields were averaged for each year to obtain the average for the year. 20-year bonds were used because there are several years over this span in which no 30-year bond data exists.



Combining these results shows that allowed returns on equity decreased less rapidly than long-term interest rates on treasury bonds. Adding the approximately 4.7% average allowed risk premium in 1996 to the 1996 average interest rate on 20-year treasuries of 7.5% produces an estimated average allowed return of 12.2% back in 1996. For 2005, the same computation produces an average allowed return of 10.44% (5.8% average allowed risk premium plus the 4.64% average interest rate on 20-year U.S. treasuries) Thus, what happened overall from 1996-2005 is that the allowed return on equity declined by only about 55% of the rate of decline in the interest rate on 20-year treasury bonds[41]

Q. WHY DID ALLOWED RETURNS DECLINE SO MUCH LESS RAPIDLY THAN INTEREST RATES?

A. Comparing the change in allowed returns on equity and the change in interest rates does not reveal why. However, from my experience in having been involved in

[41] The 1.2% drop in allowed returns from 1995-2006 divided by the 2.19% drop in the average interest rate on 20-year treasury bonds.

numerous utility rate proceedings during the 1996-2005 period, much if not all of the reason that allowed returns did not drop as fast as they should have is because too many commissions were looking over their shoulders at what other commissions were doing. Such backwards-looking analyses cause a lag in the response to interest rates.

Q. IS THERE ANY REASON TO BELIEVE THAT IN GENERAL OVER THE 1996-2005 PERIOD THE ACTUAL RISK PREMIUM BETWEEN THE COST OF EQUITY AND THE COST OF DEBT COULD HAVE REALLY GONE UP?

A. No, and the empirical data points to the contrary. Consider, for example the actual relationship between the average interest rate on BB-rated bonds and the average interest rate on BB-rated bonds as shown on the graph provided in response to PSC-COC-5 (reproduced on page 52 of this testimony). Remember that BB-rated bonds are below investment grade, and are therefore considerably more risky than A- or BBB-rated bonds. Because of the higher risk status of BB-rated bonds, they are much closer in risk to the cost of common equity for the typical regulated public utility. The graph reveals a considerable decrease in the risk spread of BB-rated bonds from 2001 to 2005, with the risk premium declining from about 4.2% above 10-year treasuries to only about 1.75% above 10-year U.S. treasuries. Note that during this same period, the U.S. Electric Utilities Allowed Risk Premium continued to increase. This analytical observation of BB interest rates confirms my experience, which is that during periods when long-term interest rates are trending downward, allowed returns fail to fall as fast as financial conditions would justify.

The following from the *Yearbook* further supports my conclusion that commissions should have been allowing lower and lower risk premiums rather than expanding them[42] :

- Regarding the stock market: "In the 1990s and 2000s, volatility was relatively moderate."

- Regarding the bond market: "While the astronomical interest rates of the 1979-1981 period has passed, the volatility of the bond market remains higher."[43]

Q. HOW HAVE YOU SEEN UTILITY COST OF CAPITAL WITNESSES USE THE ALLOWED RISK PREMIUM DATA?

A. I have seen utility cost of capital witnesses, including Dr. Morin in his testimony in Delmarva's 2005 rate case, reach the invalid conclusion that somehow the appropriate risk premium for to regulated utility companies should increase as interest rates decline. Such a conclusion is reached by statistical analysis that regresses the allowed risk premium against interest rates.

Q. IS THE REGRESSION ANALYSIS AN APPROPRIATE WAY TO ANALYZE THE DATA?

R.

A. No. Statistics texts recognize that statistical models should have a theoretical basis:

> It is sound practice to have a logically plausible model that motivates the regression equation..[44]

[42] The comment that risk premiums should have been coming down applies to the time period covered by the graphs. The impact of the Great Recession has , at least temporarily, changed that.

[43] *2009 Ibbotson SBBI Classic Yearbook* at 95.

[44] G. SMITH, *Statistical Reasoning*, at 588 (1991).

Furthermore, even if there were some underlying financial theory to support the relationship, regressing time series data in which both independent variables are in a trend is an extremely dangerous thing to do

Q. ARE YOU SAYING THAT THE RISK PREMIUM IS CONSTANT?

A. No. Elsewhere in this testimony, I showed that the current substantial upward blip in the interest rate on BB-rated bonds supports the conclusion that the risky financial conditions caused by the Great Recession have indeed resulted in what is (for now) an increase in the risk premium. However, the same analysis shows that there was nothing like a steady increase in the risk premium as would have to be true if the Allowed Risk Premium data were somehow reflective of the true state of the financial markets. Therefore, because of the BB-rated bond risk premium data, the proper way to analyze time series data statistically, and the dangerous circularity issues I discussed, it is inadvisable to determine the cost of equity for any company based upon what other commissions have allowed for other utility companies at other points in time.

E. FINANCING COST ALLOWANCE AND MARKET TO BOOK RATIO

Q. DOES A COMPANY INCUR FINANCING COSTS ASSOCIATED WITH RAISING COMMON EQUITY?

A. Sometimes. Common equity is essentially raised either by selling new stock to investors through a public offering, or by retaining earnings. When stock is sold through a public offering, such sales are typically done with the help of an investment banking firm. These firms charge for their services. However, when capital is raised via the retained earnings route, no financing charges are incurred.

Q. WHEN STOCK IS SOLD THROUGH A NEW PUBLIC OFFERING THAT RESULTS IN A PAYMENT TO UNDERWRITERS, ARE THERE ANY FACTORS THAT CAN MITIGATE THOSE CHARGES?

A. Yes. When a company sells stock at a price in excess of book value, the company's book value increases. The increase in book value benefits investors in regulated public utilities because the book value per share goes up. As Dr. Morin states on page 8, lines 8-9 of his direct testimony in this case, "[t]he rate base is essentially the net book value of the utility's plant and other assets used to provide utility service in a particular jurisdiction."

Since in most jurisdictions financing costs are not included as part of rate base, financing costs from selling new equity causes the net book value per share relevant to rate base to go down. This decrement to net book value per share can and usually is offset by an increase to net book value that occurs when the sale of this new common stock occurs above book value.

Q. HOW HAS THIS COMMISSION EVALUATED FINANCING COSTS FOR DELMARVA IN THE PAST?

A. In Order No. 6930 in Docket No. 05-304, this Commission said:

> 252. **Flotation Costs.** Finally, turning to the Company's request to include an allowance for flotation costs, the Hearing Examiner noted that the Commission has consistently rejected utilities' attempts to include an allowance for flotation costs in their authorized returns on equity. *See Delmarva Power*, *supra* at ¶231; *Wilmington Suburban*, 88 PUR 4th at 240. Furthermore, he noted that one of the leading treatises on public utility regulation stated that the need for a flotation cost adjustment is "less urgent when utility stocks are selling above book value." Bonbright, Danielsen & Kamerschen, *Principles of Public Utility Rates* at 333 (2d ed. 1988). He found that the evidence presented in this case demonstrated that utility stocks were selling above book value and that that they had been doing so for some time. (HER at 44, citing Exh. 22 (Parcell) at Sch. 12.) The Hearing Examiner found that Dr. Morin's discussion of flotation costs provided no reasons or facts to support such an adjustment that were any different than the reasons or facts put forth by expert witnesses supporting such an adjustment in prior rate cases in which this Commission has rejected such an adjustment. Thus, the Hearing Examiner recommended that the Commission reject the flotation cost adjustment.

* * *

275. With respect to flotation costs, as noted previously, Delmarva did not except to the Hearing Examiner's findings and
136recommendation that such costs be denied. We adopt the Hearing Examiner's findings and recommendations on this issue. (Unanimous.)

Q. ARE UTILITY COMPANIES' STOCKS CURRENTLY SELLING AT A PRICE IN EXCESS OF BOOK VALUE?

A. Yes. As shown on Schedule JAR-3, Page 1, the average market-to-book ratio of the electric and gas companies Dr. Morin chose as comparable to Delmarva was considerably above 1.0.

Q. ARE YOU AWARE THAT MR. KAMERICK HAS TESTIFIED THAT THE MARKET PRICE OF PEPCO HOLDINGS IS BELOW BOOK VALUE?

A. Yes. On page 21 of his direct testimony, Mr. Kamerick states that "in fact, as of September 10, 2009 PHI's stock was trading at approximately 75% of book value."

Q. IS THAT THE CORRECT PERCENTAGE OF BOOK VALUE TO USE TO EVALUATE WHETHER DELMARVA NEEDS AN ALLOWANCE FOR FINANCING COSTS?

A. No. That number must be evaluated within the context of the information provided by the Company in response to PSC–COC-4. In this response, the Company revealed that its assets include $1.4 billion of goodwill and this "[g]oodwill represents the excess of the purchase price over the fair value of net assets acquired." The response also states that none of this $1.4 billion has been included in rate base.

Q. IS THE $1.4 BILLION OF GOODWILL INCLUDED IN THE BOOK VALUE MR. KAMERICK USED TO ARRIVE AT THE 75% OF BOOK VALUE FIGURE?

A. Yes.

Q. KEEPING IN MIND DR. MORIN'S STATEMENT ABOUT THE RELATIONSHIP BETWEEN RATE BASE AND NET BOOK VALUE,, WHAT SHOULD BE DONE WITH THE GOODWILL AMOUNT?

A. To determine whether or not the net book value that equates to rate base would increase or decrease as a result of a new stock offering, the $1.4 billion goodwill balance should be subtracted from gross book value to arrive at net book value.

Q. WHAT MARKET-TO-BOOK RATIO IS OBTAINED FOR PHI IF THE GOODWILL IS SUBTRACTED?

A. The response to PSC-COC-4 states that the conclusion of PHI stock selling at 75% of book value is based on a book value per share of approximately $14. It also says that the total book value is $4.125 billion. Therefore, the $1.4 billion of goodwill represents $1.4/$4.125, or 33.9% of book value. Reducing book value per share by 33.9% to arrive at the book value figure net of goodwill results in a net book value figure of $9.25 per share. Since the stock price was 75% of $14, this means as of the time Mr. Kamerick made his market-to-book computation, the market price of PHI stock was about $10.50. $10.50 compared to the net book value figure of $9.25 means that PHI's market-to-book ratio after excluding goodwill (which has intentionally been excluded from rate base) is 1.13, or 13% *above* book value. Therefore, the Company still benefits from selling stock at $10.50 per share because the net book value will increase.

Q. PUTTING ASIDE THE BENEFIT ACHIEVED BY THE COMPANY FROM THE SALE OF COMMON STOCK ABOVE BOOK VALUE, WHAT HAS THE COMPANY'S HISTORICAL EXPENSE EXPERIENCE BEEN REGARDING EQUITY FINANCING COSTS?

A. The Company's response to PSC-COC-13 shows that PHI paid underwriters total actual financing costs of $28.7 million over the last 20 years, or an average of about $1.4 million per year for the entire PHI system. PHI's total book value was about $4.1 billion before subtracting goodwill, or $2.7 billion after subtracting goodwill. Arguably

financing costs should be computed as a percentage of total (not net) equity, because even the goodwill equity had to be raised. But even if we compute the actual annual financing costs as a percentage of net book value, the annual cost rate is still only $1.4 million/$2.7 billion = .05%, or 5 basis points. This is $1/6^{th}$ of the 30 basis point allowance Dr. Morin recommends.

Q. BASED ON THE ABOVE, IS AN ALLOWANCE FOR FINANCING COSTS APPROPRIATE IN THIS CASE?

A. No. I agree with the Commission's prior rulings that financing costs are unnecessary. For Delmarva, the fees paid to underwriters have averaged only about 5 basis points per year. These 5 basis points are readily more than offset by making sales of new common equity above net book value.

IV. IMPACT OF REVENUE DECOUPLING

Q. HOW WOULD THE REVENUE DECOUPLING PROPOSAL AFFECT THE RISK OF INVESTING IN DELMARVA COMMON EQUITY?

A. Revenue decoupling will substantially minimize non-diversifiable risks. The risk of unexpected operating expenses or other operational issues will remain, but these risks are largely diversifiable.

Q. WHY DO YOU DIFFERENTIATE BETWEEN DIVERSIFIABLE AND NON-DIVERSIFIABLE RISKS?

A. Investors are only compensated for non-diversifiable risk. Non-diversifiable risk is essentially risk caused by overall economic conditions.

A way of understanding why diversifiable risks do not add to the cost of equity is to examine a model of inherently risky bets on coin tosses. Assume that you had to risk a total of $1,000 betting on heads. If you put the entire $1,000 at risk on a single flip,

you would have exactly a 50% chance of losing the entire $1,000. However, if instead, you diversified your betting the $1,000 to $1 per toss on a series of 1,000 tosses, the outcome would be much less risky. In this example, the effects of diversification are dramatic: you would have a 97.5% chance of having at least $968 of the $1,000 left and essentially no chance that the entire $1,000 would be lost.

Investing in common stocks works the same way. Investing in only one company produces a much greater chance of a large loss than spreading the same investment out over numerous companies in different industries.

Q. IN YOUR COIN TOSS EXAMPLE, WHAT WOULD CONSTITUTE A NON-DIVERSIFIABLE RISK?

A. Non-diversifiable risk is analogous to "the house" at a casino taking its cut. If the casino takes a certain percentage on every roll, then the investor cannot diversify this percentage away no matter how many tosses he makes. If the overall economy was "the house" it would sometimes hand out money and not always take, as in this coin toss/casino analogy. Historically, the "economic house" has provided a positive return to investors.

Q. HOW WOULD REVENUE DECOUPLING IMPACT NON-DIVERSIFIABLE RISK?

A. Non-diversifiable risk is rooted in the movement of the entire economy. When the economy goes into recession, most companies are negatively impacted. When most companies are impacted by the same thing, the effect of diversification is negated. Other things being equal, a recession would cause Delmarva's customers (especially its commercial and industrial customers) to use less electricity. But revenue decoupling would almost completely insulate Delmarva from losing revenues as a result. Therefore,

revenue decoupling would attenuate the correlation of overall economic growth to Delmarva's earnings and the contribution those earnings have to PHI's stock price.

Q. WOULD REVENUE DECOUPLING ELIMINATE ALL THE RISKS TO DELMARVA INVESTORS?

A. No. It would not eliminate risks such as operating cost overruns and other problems that could increase operating expenses. Since these risks are independent of the overall economy, an investor can eliminate these risks by investing in a portfolio of many stocks. Some of the companies in a portfolio will have positive operating expense surprises and others negative ones.

Some non-diversifiable risk would remain. The main one would be the risk of cost escalations due to general economic conditions: that is, the risk that Delmarva would have to pay higher prices for labor and materials inputs due to boom-time high demands.

Q. HOW MUCH WOULD REVENUE DECOUPLING LOWER DELMARVA'S RISK?

A. Probably the best starting point would be an analysis that shows historically how revenue decoupling would have changed the Company's income. Such an analysis would not only provide better insight into the actual decrement to common equity risk resulting from decoupling, but would also provide useful guidance for the optimal capital structure design.

Q. HAS SUCH AN ANALYSIS BEEN DONE?

A. Amazingly, the Company performed no such study. (See response to PSC-COC-52). The lack of suck a study disadvantages the Commission in deciding the appropriate decrease to the cost of equity.

Q. IN THE ABSENCE OF SUCH A STUDY, TO WHAT EVIDENCE CAN YOU LOOK TO DETERMINE THE IMPACT OF REVENUE DECOUPLING ON THE COST OF EQUITY?

A. One example is what happens to the cost of capital when a revenue stream effectively guaranteed by ratepayers is implemented to finance an asset of a utility company. By creating this guarantee, the risk borne by bond investors is reduced sufficiently so that they (1) are willing to invest even without any equity capital to protect them; and (2) are willing to invest in debt that pays interest at very low risk AA or AAA risk categories[45]..

Q. WHERE HAVE YOU SEEN THIS?

A. I have seen this when utility companies have securitized stranded cost debt. One example of this securitization occurred when Atlantic City Electric Company, another PHI affiliate, issued such debt. The very highly rated debt and the ability to finance the securitized assets with 100% debt rather than a traditional mix of debt and equity is possible for a securitized asset. This is because investors have been assured that if there should be a revenue shortfall to service the debt financing the securitized assets, there is a clear path that will require ratepayers to make up the shortfall. Although the proposed revenue decoupling does not have the recovery of shortfalls, it maintains the Company's income at the same level irrespective of changes in customer usage. Therefore, if implemented, the revenue decoupling would drive Delmarva's cost of equity down substantially, but not below the cost of AA-rated debt.

Q. DO YOU RECOMMEND THAT THE DECREASE IN THE PRESENT RATE OF RETURN BE CONSTRAINED TO ACCOUNT FOR THE RISK THAT REVENUE DECOUPLING MIGHT SUBSEQUENTLY BE REJECTED?

[45] Part of the reason the extremely high AAA bond rating was achieved rather than the still very strong AA bond rating was because debt insurance was purchased.

A. No. The cost of equity should be lowered to the level appropriate for a company with revenue decoupling in place for as long as the decoupling procedures remain. Should revenue decoupling be cancelled, the cost of equity reduction should be removed at that time.

Q. WHAT IS THE APPROPRIATE COST OF EQUITY REDUCTION CAUSED BY REVENUE DECOUPLING?

A. Currently, the cost of 20-year AA- rated debt is about 5.54%.[46] This is 3.96% less than my recommendation for Delmarva's cost of equity. Without a study showing how much income stability would result from revenue decoupling, a conclusion on how much to lower the cost of equity is inherently less precise. Recognizing the 3.96% difference between the cost of AA-rated debt and Delmarva's current cost of equity, it is appropriate to lower the cost of equity by at least 1.00%. This 1.00% should be revisited if and when the company provides the requested study showing how revenue decoupling would have impacted earnings variability over the last ten years.

V. COMMENTS ON TESTIMONY OF DR. MORIN

Q. HAVE YOU READ THE TESTIMONY FILED BY COMPANY COST OF CAPITAL WITNESS DR. MORIN IN THIS PROCEEDING?

A. Yes.

Q. WHAT IS YOUR OVERALL REACTION TO HIS TESTIMONY?

A. Dr. Morin's cost of equity recommendation of 10.75% with an SFV or 11.00% without an SFV is much too high. A careful reading of his testimony shows why:

[46] Yahoo Finance, January 13, 2010

DCF METHOD. In his DCF method, he used analysts' short-term growth rates in EPS as a proxy for long-term growth in cash flow. I explained earlier in this testimony why using a five-year EPS growth rate as a proxy for long-term growth in dividends and stock price is a serious violation of mathematics and finance that introduces needless and substantial errors into the computation. (See page 20, *supra*)

CAPM METHOD. In applying his risk premium methods, Dr. Morin has again violated mathematics and finance by relying on the upwardly biased arithmetic average, which inflates the historical actual returns. I discussed the problems caused by using the arithmetic average earlier in this testimony. (See page 58, *supra*)

Q. HOW HAS DR. MORIN IMPLEMENTED HIS RISK PREMIUM APPROACHES IN THIS CASE?

A. Dr. Morin says he performed three risk premium studies. The first two used aggregate stock market evidence "using two versions of the CAPM method," while the third "... deals directly with the utility industry." He identified his first two risk premium approaches as the CAPM and the ECAPM, where ECAPM is an "empirical approximation to the CAPM." For his risk-free rate he used 4.3%, based on the current interest rates on long-term U.S. treasuries. (Morin Direct, pages 15-16).

Q. PLEASE COMMENT ON DR. MORIN'S USE OF THE LONG-TERM TREASURY BOND RATE AS THE RISK-FREE RATE IN HIS RISK PREMIUM ANALYSES.

A. All long-term bonds, including U.S. treasury bonds, contain a maturity premium. The component that is the maturity premium is *not* risk-free because any fixed interest rate bond contains the risk of future interest rate movements. As a result, there is much wrong with Dr. Morin's selection of the 4.3% long-tern treasury bond interest rate as his risk-free rate. This rate is only risk-free regarding the payment of interest and principal. Treating an interest rate that contains risk as if it were risk-free understates Dr. Morin's downward adjustment for beta in his CAPM and therefore overstates the cost of equity.

Q. ON PAGE 17, LINES 8-10 OF HIS DIRECT TESTIMONY, DR. MORIN SAYS THAT HE CHOSE THE LONG-TERM TREASURY RATE BECAUSE COMMON STOCKS ARE A VERY LONG-TERM INVESTEMENT. PLEASE COMMENT.

A. Dr. Morin is focusing on the wrong thing. Sure, common stock theoretically lasts much longer than bonds because, unlike bonds, common stock has no maturity date whatsoever. Common stock remains outstanding unless a company buys its own stock back, is bought out, or goes out of business. The purpose of selecting the risk-free interest rate is to find the difference between the interest rate on a risk-free investment and the investment in the common stock of a company with average risk (the "risk premium"). The appropriate risk premium is the one that captures the complete risk difference between a risk-free investment and the risk of that common stock. To properly implement the CAPM method, this premium should capture all risk because the risk premium is multiplied by the beta of a group of companies to arrive at the risk premium specifically applicable to that group of companies. The resulting risk-adjusted beta is then added to the chosen risk-free rate to derive the CAPM-indicated cost of equity. Unless the risk premium used completely captures risk, the beta-based adjustment to the risk will understate the magnitude of the adjustment.

Q. ON PAGE 17, LINES 20-21 OF HIS TESTIMONY, DR. MORIN SAYS THAT "WHILE LONG-TERM TREASURY BONDS ARE POTENTIALLY SUBJECT TO INTEREST RATE RISK, THIS IS ONLY TRUE IF THE BONDS ARE SOLD PRIOR TO MATURITY." PLEASE COMMENT.

A. Dr. Morin is discussing an irrelevant dimension to the problem. He is mistakenly ignoring opportunity cost. An investor who purchased a 30-year treasury bond paying 4% when originally issued and who holds that bond until maturity gets 4% per year whether or not other treasury bonds in which he could have invested are paying 3%, 4%,

5%, etc. So, everyone who buys a 30-year treasury bond is exposed to interest rate risk. Imagine how an investor who purchased a newly issued 30-year treasury bond with a 4% coupon yield would feel if a short time later such bonds were being sold with a 5% coupon yield. Not only would the price that the investor could sell the 4% bond be way down, but he would be receiving considerably lower annual interest payments than if he had purchased the bond paying the higher interest rate instead.

Q. ON PAGE 18, STARTING AT LINE 17, DR. MORIN EXPLAINS WHY HE REJECTS THE USE OF SHORT-TERM INTEREST RATES AS THE RISK-FREE RATE. PLEASE RESPOND.

A. He is correct that using spot short-term interest rates is not a good solution. The Federal Reserve intentionally manipulated short-term interest rates to help control the economy; therefore, they may not reflect true market-based interest rates. Also, supply and demand imbalances can cause temporary distortion. But, as I explained earlier, the solution is to compute a normalized short-term interest rate by starting with a long-term interest rate and subtracting an allowance for the maturity premium. This rate has the identical changes to the interest rate as the long-term interest rate. Its advantage is that the CAPM beta adjustment can be applied to all of the risk difference between a true risk-free rate and the cost of equity for a company of average risk.

Q. WHEN APPLYING HIS CAPM METHODS, HOW DOES DR. MORIN QUANTIFY HIS ADJUSTMENT FOR RISK?

A. As is the standard approach for applying the CAPM, Dr. Morin concluded that risk is related to beta. He obtained his beta by determining the average beta of various proxy groups that he selected. One of those groups included "dividend-paying combination electric and gas electric utilities covered by Value Line that have (i) at least 50% of their revenues from regulated utility operations, and (ii) a market capitalization

less than is than (sic) $500 million." He notes that the average beta for the group is 0.72. The other group is the electric utilities included in the S&P Electric Utilities Index, and the average beta for the companies in that group was 0.76. (See Morin Direct at 20). Thus, the average beta for the two groups (and the beta that he used) is 0.74.

A problem with his first proxy group is that by his criteria, a company with as much as 49% unregulated activities could be included in the group. Without any analysis of the unregulated activities of the companies included in the proxy group, there is no way to know how risky these unregulated operations may be. Noting that the average beta for all industry is 1.0, if unregulated activities were as high as almost 50% and the beta including the effect of these unregulated activities was 1.0, then the beta of the relevant regulated portion would be way lower than 0.72. Since the lower the relevant beta, the lower the CAPM-indicated cost of equity, this is yet another built-in upward bias in Dr. Morin's analysis. As for the S&P proxy group, Dr. Morin does not specify capital structure, size, or percent unregulated. For these reasons alone, key information to relate the beta of 0.76 to the beta of 0.72 is missing.[47]

Dr. Morin further notes that Delmarva's parent PHI's beta is 0.80, "indicating [that it is] riskier than average". (Morin Direct at 20). While a beta of 0.80 indicates

[47] I have reluctantly used the same group of electric and gas companies that were selected by Dr. Morin because it is not practical to compile a group of electric and gas utilities that have minimal impact from unregulated activities. However, I do reject using the broader group of S&P Electric Utilities because of an even broader exposure to unregulated businesses. Given the impact of unregulated activities, the beta of 0.72 for the group of electric and gas utilities selected by Dr. Morin likely overstates the beta applicable to Delmarva. Arguably, I could have made an adjustment to lower the beta of 0.72 before using it in the CAPM formula. I did not do so because the precise amount of the adjustment is controversial. However, I point out the flaw in Dr. Morin's approach both to emphasize how the cost of equity for his selected group will overstate the risk of investing in Delmarva and that Dr. Morin's adjustment to increase the beta from 0.72 to 0.74 is an adjustment in the wrong direction.

higher risk than a beta of 0.72, it does *not* tell us if *Delmarva* is more or less risky than the average of the proxy group. It only tells us that Delmarva's *parent company* (which includes unregulated businesses) is riskier than the average of the proxy group. Furthermore, PHI's beta takes into account the risk associated with PHI's unregulated activities. According to Standard & Poor's:

> We consider the unregulated businesses significantly more risky than the utilities due to their exposure to volatile commodity prices and very competitive energy markets. These risks are partly mitigated by the company's strategy to hedge a majority of it capacity over a two-to three-year period.[48]

Q. ON PAGE 21 OF HIS DIRECT TESTIMONY, DR. MORIN CONCLUDES THAT THE DEBT-EQUITY RISK PREMIUM IS 6.5%. PLEASE COMMENT.

A. The largest problem with the development of this 6.5% is his use of the arithmetic average, which I have discussed at length earlier in my testimony.

Q. PLEASE RESPOND TO DR. MORIN'S STATEMENT THAT 2008 STOCK MARKET PERFORMANCE DATA SHOULD BE IGNORED BECAUSE OF THE MARKET'S DISASTROUS PERFORMANCE THAT YEAR (MORIN DIRECT AT 23).

A. While it is true that 2008 was a horrible year for the U.S. stock market, the *Yearbook* still found that even after the 2008 crash, the historical returns from 1926-2008 were sufficiently high as to require a downward adjustment of 0.6%.[49]

Q. ON PAGE 25, DR. MORIN DISCUSSES A PROPOSED MODIFICATION TO THE CAPM BECAUSE OF WHAT HE BELIEVES TO BE A DIFFERENCE BEETWEEN THE PREDICTIED VERSUS THE OBSERVED RETURNS FROM THE CAPM. PLEASE COMMENT.

A. Dr. Morin acknowledges that the cost of capital is supposed to be proportional to beta in the CAPM theory. As the beta gets smaller and smaller, the required return

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[48] See Delmarva response to PSC-COC-6.

[49] *Ibbotson SBBI 2009 Classic Yearbook*, pages 144-45.

likewise continues to be reduced. When the beta is zero, the required return is the risk-free rate. On page 25 of his testimony, Dr. Morin provides empirical data that he thinks disproves the basic premise of the CAPM.

Q. DOES IT?

A. No. All he does is show that using the arithmetic average to compile historical returns fails to produce results consistent with what was expected from the CAPM. But, as I have shown earlier in this testimony, if one replaces the flawed arithmetic averaging approach with the correct compound annual (geometric) average approach, the empirical data confirms the CAPM theory.

Q. PLEASE COMMENT ON DR. MORIN'S STATEMENTTHAT "THE CAPM ESTIMATES ARE NOT SIGNIFICANTLY ABOVE THE COST OF NEW DEBT CAPITAL AND LIKELY UNDERSTATE THE COST OF EQUITY CAPITAL UNDER CURRENT UNSETTLED CAPITAL MARKET CONDITIONS." (MORIN DIRECT AT 28).

A. Actually, the 9.4% to 9.8% equity cost range Dr. Morin obtained from his equity risk premium methods *is* significantly higher than the cost of new debt, and capital markets have gone through a substantial settlement process. The graph provided in response to PSC-COC-5 (reproduced on page 52 of this testimony) shows that by November 2009, the spread on A-rated utility bonds over 10-year treasury bonds was only slightly above normal. As of December 24, 2009, the U.S. Federal Reserve's website stated that the interest rates on seasoned Aaa- and Baa-rated corporate bonds were 5.38% and 6.47%, respectively

Q. HOW DOES DR. MORIN'S 9.4% TO 9.8% CONCLUSION FROM HIS RISK PREMIUM BASED METHODS COMPARE TO YOUR FINDING?

A. While there are numerous things wrong with Dr. Morin's implementation of the CAPM, his end result is only about 0.3% to 0.7% higher than my result. While this is

certainly a relevant difference in a cost of equity allowance, our results are usually much further apart. The reason they are closer this time is essentially because what is normally a large difference in our results - caused by Dr. Morin's failure to use the compound annual (geometric) method to quantify actual historical earnings rates, and because of his under-adjusting for beta resulting from his excessive risk-free rate - is offset by another factor: Dr. Morin did not make an adjustment for the higher risk premium that exists because of heightened investor fears caused by the Great Recession. Therefore, in this marketplace, the appropriate upward adjustment for extra risk partially offsets Dr. Morin's mistakes. If this extra risk premium dissipates over time, Dr. Morin's risk premium approaches will likely again provide very large overstatements of the cost of equity.

Q. PLEASE DESCRIBE DR. MORIN'S APPROACH TO THE DCF METHOD.

A. Dr. Morin defines the traditional DCF model as a method that sums the dividend yield and a growth rate to arrive at the cost of equity. Although this formulation could be viewed as the traditional form used by utility regulators, it is *not* the traditional DCF model from a financial perspective. As previously discussed, the DCF model starts out as a more complex formula that allows for non-constant cash flows in each subsequent period. Then, the simplified form of the model that Dr. Morin calls the traditional model is derived from the complex form in a way that recognizes that it is only valid when it is reasonable to estimate that future growth in dividends and stock price are expected to be maintained at the same constant rate for a long time.[50]

[50] Technically, this constant growth form of the DCF method requires future expectations that the chosen growth rate for earnings, dividends, book value, and stock price will be maintained for an infinite number of years. As a practical matter, several

Q. DOES DR. MORIN ACKNOWLEDGE THAT THE GROWTH RATE IN THE VERSION OF THE FORMULA HE CHOSE TO USE APPLIES TO THE EXPECTED GROWTH RATE IN DIVIDENDS AND STOCK PRICE?

A. Yes. Dr. Morin says that the standard DCF model requires: (1) a constant average growth trend for both dividends and earnings, (2) a stable dividend payout ratio, (3) a discount rate in excess of the growth rate, and (4) a constant price-earnings multiple, meaning that earnings and dividends grow at the same rate. These are correct requirements for the constant growth form of the DCF model. (See Morin Direct at 32-33). But even though he recognizes this, the only growth rate he uses is an EPS growth rate projection over a relatively short period. His large error of omission here is that stock price growth and dividend growth are commonly very different than EPS growth, especially over a period as short as the one relied upon by Dr. Morin for his EPS growth rate. This is explained in more detail starting on page 21 of this testimony.

Q. DOES DR. MORIN'S IMPLEMENTATION OF THE DCF MODEL DO ANYTHING TO DEAL WITH THESE REQUIREMENTS?

A. No. Dr. Morin states the problem, but then ignores it. Namely, as he says on page 33: "As a proxy for expected growth, I examined the consensus growth estimate developed by professional analysts employed by large investment brokerage institutions." What he does not say is that these are five-year growth rates rather than long-term sustainable growth rates, so they do not meet the criteria he outlined above.

Nor does his defense of his use of this growth rate indicator have anything to do with the criteria he outlined. He says on page 33 that these growth rates are readily available and represent the consensus view of investors. Whether or not they are the

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decades is long enough because eventually the net present value of the future expected cash flow becomes very small.

consensus view has nothing to do with the issue, which is whether they are the correct form of growth to fit into the constant growth form of the DCF model Dr. Morin has proposed.

Q. HAS DR. MORIN EXPLAINED ANYTHING HE HAS DONE TO TEST THE APPLICABILITY OF THESE FIVE-YEAR GROWTH RATES FOR A LONGER TIME INTO THE FUTURE?

A. No. Rather than citing these growth rates as five-year growth rates, he describes them as "long-term growth forecasts." (Morin Direct, page 34).

Q. DOES DR. MORIN PROPOSE THE USE OF A SUSTAINABLE GROWTH RATE METHOD?

A. No, and this is another great flaw of his testimony. At pages 35-36 of his direct testimony, Dr. Morin discusses the sustainable growth method, pursuant to which growth is computed by setting growth equal to the retention rate times the future expected return on book equity. He says that the sustainable growth rate method is only accurate if the return on book equity (ROE) is constant over time. But this criticism is unfair: while it is true that the sustainable growth rate method can lose some of its accuracy if investors believe that the return on book equity is trending in one direction or the other rather than maintaining a relatively constant course, the fact is that Dr. Morin's DCF approaches are far more vulnerable to inaccuracy in this situation.

Q. CAN YOU SHOW WHY THIS IS TRUE?

A. Yes. Consider what would happen for a company currently earning 9% on a $10.00 book equity value if an analyst expected that over the next five years that company's return on book equity would be temporarily high (say 12%) and would then drift back down to the more sustainable 9% . In this example, growth over the next five years would include the normal 9% growth plus the temporary supercharged growth to

get the EPS high enough for the return on book to become 12% . Increasing the earned return on equity from 9% to 12% for this company would require the one-time unsustainable increase in earnings per share from $0.90 to $1.20 – a 33% increase. The earnings growth rate caused by this temporary increase on the earned return on equity would have an effect on the earnings per share growth rate that would otherwise occur over a five-year period. Before considering the impact of compounding, a 33% non-sustainable growth rate over five years would increase Dr. Morin's measure of "g" over that period by 6.6%. Even after considering the impact of compounding, this overstatement of the annual sustainable growth rate would still be 5.9% per year - a dramatic and very very dangerous error. Thus, it might be sub-optimal to use the D/P +g simplified form of the DCF model in this situation, but Dr. Morin's approach would result in a substantially inaccurate DCF-calculated cost of equity.

In this same hypothetical, computing the sustainable growth rate using the 12% expected return on equity as a proxy for investors' expectations would also overstate the sustainable growth rate, but by a much smaller amount. If the same company for which analysts expected a return on equity increase from 9% to 12% over five years were paying a dividend of $0.70, and if the sustainable growth rate were computed (as it should be) by relating the dividend rate to the value used for the future expected return on equity, then the retention rate used for the sustainable growth rate method would be 1- $.70/$1.20, or 41.7%. This would also make the sustainable growth rate result too high, but only too high by no more than the mistake used by using 12% as the value of the future expected ROE instead of using 9%. Since the difference between 12% and 9% is 3%, in this hypothetical the sustainable growth rate method would overstate

growth by 41.7% x 3%, or 1.25%, instead of the more correct growth rate that would be obtained from the 9%. Note further that in the case where a company had been earning 9% but was expected to see its earned return on equity increase to and stay at 12%, the five-year analysts growth rate method used by Dr. Morin would still overstate sustainable growth by 5.9%, but the "b x ROE" growth rate method would contain no error at all.

Q. ON PAGE 36, LINE 5 OF HIS DIRECT TESTIMONY, DR. MORIN CLAIMS THAT THE SUSTAINABLE GROWTH RATE METHOD FAILS TO CAPTURE GROWTH CAUSED BY STOCK SALES AT SOMETHING OTHER THAN BOOK VALUE. PLEASE COMMENT.

A. To reach this conclusion, Dr. Morin has to make the assumption that the user of the b x ROE method applies the method incorrectly. I have been using the "b x ROE" method for decades, and have consistently adjusted growth specifically to account for the extra growth caused by sales of common stock above book value. The textbook derivation of the sustainable growth rate method is that growth is equal to "b x ROE + sv," where "sv" is the term that provides the allowance for sales of common stock at something other than book value. It is Dr. Morin's incomplete description of the sustainable growth rate method, rather than the method itself, that has created a problem that does not exist when the sustainable growth rate method is properly applied.

Q. DOES DR. MORIN HAVE ANY OTHER COMPLAINTS ABOUTTHE SUSTAINABLE GROWTH RATE METHOD?

A. Yes. On page 36 of his direct testimony, Dr. Morin says "Second, and more importantly, the sustainable growth method contains a logic trap: the method requires an estimate of ROE to be implemented. But of the ROE input required by the model

differs from the recommended return on equity, a fundamental contradiction in logic follows."

There is no contradiction in logic. In making this statement, Dr. Morin ignores an important point: that the cost of equity "k" is equal to D/P + g, where D, P and g *are all measured at the same time.* If something happens to change the expectation of g, unless there is a corresponding change in the cost of equity, then there *must* be a change in D and/or P for the equation to maintain validity. Since the equation is properly used by relating the stock price at one point in time to what investors expect for dividends and growth at that same point in time, the integrity of the sustainable growth DCF result remains fully robust whether or not something might change in the future to alter investors' growth expectations. All that would happen is the stock price would change to offset the change in growth expectation in a sufficient amount to leave the cost of equity "k" unchanged.

Q. DO CHANGES IN THE EXPECTED RETURN ON BOOK EQUITY IMPACT THE GROWTH RATE AS QUANTIFIED BY ANALYSTS?

A. Yes, which makes Dr. Morin's criticism of the sustainable growth rate especially curious. Analysts' growth rates, whether the ones compiled by Zacks or the ones created by Value Line, would be different if a different allowed return on equity were expected. How could Dr. Morin possibly think that the earnings growth rate over the next five years could be the same if the expectation for the earned return on equity five years from now were computed by analysts based on an expectation of an earned return on book equity of 12%, but a commission were to allow instead a return on equity such that that expectation of the future earned return on book equity were to decline to 9%? Of course, it could not. So both Dr. Morin's approach to the DCF and the sustainable

growth approach to the DCF are subject to changes in the input based upon the answer obtained from the DCF.

Actually, because of the inherent characteristic of five-year analysts' growth rates as relied upon by Dr. Morin to exaggerate the effect of one-time changes in the earned return on equity, Dr. Morin has it backwards. What Dr. Morin alleges is a "logical trap" in the sustainable growth rate method is really a flaw that is only applicable to the inherently distorted five-year growth rate methods he uses, not to the far more capable "b x ROE" version of the sustainable growth DCF method as I use it.

Q. PLEASE COMMENT ON THE IMPACT OF POSSIBLE CHANGES IN THE DIVIDEND PAYOUT RATIO.

A. On page 36, Dr. Morin says that utilities are widely expected to lower dividend payout ratios in the future. This is a direct violation of the requirements he has stated must exist to be able to use what he calls the traditional DCF method. When the payout ratio declines, other things being equal the extra retention of earnings will make earnings grow more rapidly, but will cause the D/P version of the "traditional" DCF to fail to keep up. This failure to keep up effectively causes the D/P portion of his equation to be lower and lower over time, and the effect of this is to further overstate his DCF-derived cost of equity. But Dr. Morin failed to consider this. He says on pages 36-37 that when this happens, "[t]he assumptions of constant perpetual growth and constant payout ratio are clearly not met;" therefore, the DCF result is of questionable relevance. This is an overstatement because we know that if the payout ratio is going down, Dr. Morin's version of the DCF model will ignore the lower dividend yields that result from such a drop in the dividend payout ratio.

Q. ON PAGE 36, DR. MORIN SAYS THAT THE SUSTAINABLE GROWTH RATE IS NOT AS SIGNIFICANTLY CORRELATED TO MEASURES OF VALUE. PLEASE COMMENT.

A. To the extent the studies referenced by Dr. Morin examine the sustainable growth rate method, they do so by using historical values for "b" and "r." I agree that any approach to growth, be it the sustainable growth rate method that relies on historical values of "b" and "r," or a method that uses historical EPS and historical dividends per share, is invalid. That approach is completely different than the approach I use and therefore Dr. Morin's criticism does not apply.[51]

Q. HAS DR. MORIN MADE AN ADDITION TO HIS COST OF EQUITY TO PROVIDE AN ALLOWANCE FOR FINANCING COSTS?

A. Yes. Dr. Morin computes his financing cost allowance by applying a 5% allowance to the dividend yield. The net result of this is an upward adjustment of 0.30% to his cost of equity.

Q. IF THIS 0.30% FINANCING COST ALLOWANCE RECOMMENDED BY DR. MORIN WERE APPLIED TO ALL OF PHI, WHAT WOULD THE ANNUAL ALLOWANCE BE?

A. As I explained earlier, an allowance of 0.30% for financing costs is way in excess of the actual costs incurred by PHI to raise the capital for Delmarva and is therefore inappropriate.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

[51] It is gratifying to hear Dr. Morin now taking a position against using historically based methods to compute growth. This is because I criticized him for using historically based growth rate computations in his DCF back when I first encountered him in utility rate proceedings.

APPENDIX A.

TESTIFYING EXPERIENCE OF JAMES A. ROTHSCHILD

ALABAMA

Continental Telephone of the South; Docket No. 17968, Rate of Return, January, 1981

ARIZONA

Southwest Gas Corporation; Rate of Return, Docket No. U-1551-92-253, March, 1993
Sun City West Utilities; Accounting, January, 1985

CONNECTICUT

Aquarion Water Company, Docket No. 04-02-14, Rate of Return, June 2004
Connecticut American Water Company; Docket No. 800614, Rate of Return, September, 1980
Connecticut American Water Company, Docket No. 95-12-15, Rate of Return, February, 1996
Connecticut Light & Power Company; Docket No. 85-10-22, Accounting and Rate of Return, February, 1986
Connecticut Light & Power Company; Docket No. 88-04-28, Gas Divestiture, August, 1988
Connecticut Light & Power Company, Docket No. 97-05-12, Rate of Return, September, 1997
Connecticut Light & Power Company, Docket No. 98-01-02, Rate of Return, July, 1998
Connecticut Light & Power Company, Docket No. 99-02-05, Rate of Return, April, 1999
Connecticut Light & Power Company, Docket No. 99-03-36, Rate of Return, July, 1999
Connecticut Light & Power Company, Docket No. 98-10-08 RE 4, Financial Issues, September 2000
Connecticut Light & Power Company, Docket No. 00-05-01, Financial Issues, September, 2000
Connecticut Light & Power Company, Docket No. 01-07-02, Capital Structure, August, 2001
Connecticut Light & Power Company, Docket No. 03-07-02 , Rate of Return, October, 2003
Connecticut Natural Gas; Docket No. 780812, Accounting and Rate of Return, March, 1979
Connecticut Natural Gas; Docket No. 830101, Rate of Return, March, 1983
Connecticut Natural Gas; Docket No. 87-01-03, Rate of Return, March, 1987
Connecticut Natural Gas, Docket No. 95-02-07, Rate of Return, June, 1995
Connecticut Natural Gas, Docket No. 99-09-03, Rate of Return, January, 2000
Southern Connecticut Gas, Docket No. 97-12-21, Rate of Return, May, 1998
Southern Connecticut Gas, Docket No. 99-04-18, Rate of Return, September, 1999
United Illuminating Company; Docket No. 89-08-11:ES:BBM, Financial Integrity and Financial Projections, November, 1989.
United Illuminating Company; Docket No. 99-02-04, Rate of Return, April, 1999
United Illuminating Company, Docket No. 99-03-35, Rate of Return, July, 1999
United Illuminating Company, Docket No. 01-10-10-DPUC, Rate of Return, March 2002

DELAWARE

Artesian Water Company, Inc.; Rate of Return, December, 1986
Artesian Water Company, Inc.; Docket No. 87-3, Rate of Return, August, 1987
Diamond State Telephone Company; Docket No. 82-32, Rate of Return, November, 1982
Diamond State Telephone Company; Docket No. 83-12, Rate of Return, October, 1983
Wilmington Suburban Water Company; Rate of Return Report, September, 1986
Wilmington Suburban Water Company; Docket No. 86-25, Rate of Return, February, 1987

FEDERAL ENERGY REGULATORY COMMISSION (FERC)

Koch Gateway Pipeline Company, Docket No. RP97-373-000 Cost of Capital, December, 1997
Maine Yankee Atomic Power Company, Docket No. EL93-22-000, Cost of Capital, July, 1993
New England Power Company; CWIP, February, 1984. Rate of return.

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APPENDIX B.

Value Line's Estimation of Beta

The return on security I is regressed against the return on the New York Stock Exchange Composite Index in the following form:

$$\text{Ln}\left(p^{I}_{t} / p^{I}_{t-1}\right) = a_I + B_I * \text{Ln}\left(p^{m}_{t} / p^{m}_{t-1}\right)$$

Where:

p^{I}_{t} - The price of security I at time t

p^{I}_{t-1} - The price of security I one week before time t

p^{m}_{t} and p^{m}_{t-1} are the corresponding values of the NYSE Composite Index.

The natural log of the price ratio is used as an approximation of the return and no adjustment is made for dividends paid during the week.

The regression estimate of beta, B_I, is computed from data over the past five years, so that 259 observations of weekly price changes are used.

Value Line adjusts its estimate of beta for regression bind described by Blume (1971). The reported beta is the adjusted beta computed as:

$$\text{Adjusted } B_I = 0.35 + .67 * B_I$$

M. Blume, "On the assessment of risk," Journal of Finance, March 1971

APPENDIX C
FUZZY MATH ARTICLE

Financial Advisers and Fuzzy Math

By KAJA WHITEHOUSE
Dow Jones Newswires

Next time your financial adviser makes a prediction for an average rate of return during an investment pitch, you might want to doublecheck the math.

Some financial advisers rely too heavily on a formula known as arithmetic average, which can be misleading when investing for the long term. Financial advisers who use this formula may be overstating your potential profit and leading you to take risks you might otherwise avoid, academics and other financial professionals say. Errors tend to widen when it comes to very volatile securities, like emerging-markets stocks.

Arithmetic math involves a very simple formula, which is probably why so many people rely on it. To decide an average return, you add up all the return percentages and divide the results by the number of percentages.

It's a perfectly valid way to determine an average, as long as it's used to frame a stand-alone one-year return, said Knut Larsen, a partner with Brigus Group, a Toronto education service for financial advisers.

The classic example to illustrate the flaws with arithmetic math goes like this: You start with an investment of $100 and it grows 100% the first year and loses 50% the next year. To calculate the total return using arithmetic math, you would add the returns from both years—in this case 100 minus 50—and divide them by two, or the number of returns.

That leaves you with the illusion of a 25% profit, when in reality you're right back where you started—with $100. After rising 100% the first year, you had $200; but a drop of 50% cut that in half, back down to $100.

The alternative is known as geometric average, or compound annual return. This takes compounding and volatility into consideration.

Unfortunately, geometric average is a complicated formula, involving cube roots, so it may not be possible to figure out the results without a spreadsheet. But the point is to educate yourself on the issue, not to memorize complex formulas, Mr. Larsen said. Simply understanding when one formula should be used over the other, and knowing the flaws of arithmetic math is a good start, he said.

S&P 500 index annual returns from 1927 until now are lower using geometric math.

When comparing the two results, the arithmetic average generally ends up being higher than the geometric average, said Campbell Harvey, a finance professor with Duke University's Fuqua School of Business. For example, annual returns on the S&P 500 index from 1927 until now are about 12% using arithmetic math, and 10% using geometric math. That's a two percentage point difference.

The deviation isn't always enough to get worked up about, but it depends on factors such as volatility, and even fees and interest. For example, the greater the volatility of the security in question, the greater the spread will be between the two results, Mr. Harvey said.

He recalls feeling struck once by an advertisement touting Brazilian stocks attached to data showing "incredible returns" of about 50% a year. Knowing Brazil is a volatile market, Mr. Harvey went back and applied geometric math to the returns. His findings produced an average return closer to zero.

Volatility can affect the portfolio in negative ways because a severe drop makes it that much harder to catch up on the reduced amount, even if returns are phenomenal thereafter. But when using arithmetic average, all that is known is the one-year average return, not total results.

Misleading return projections using arithmetic math are common in the insurance world, said Peter Katt, an insurance analyst in Mattawan, Mich. Some products require high return forecasts to make the products work, and this is one way to get around that, he said, adding that consumers need to educate themselves.

"I deal with very bright clients and advisers, and they have no idea what I'm talking about" when referring to the different formulas for calculating results, he said.

It may seem like a lot of financial hocus-pocus, but sometimes the misrepresentations aren't intentional, Mr. Larsen said. He published a primer on the subject this summer after bumping into a financial adviser who legitimately didn't know the effects arithmetic math was having on his planning. The adviser had a client who suffered a portfolio loss of 45%, and the adviser believed the client would need an annual return of 15% a year to get back to the original investment in three years. In reality, he would have to prepare for a return of more like 22% a year, according to Mr. Larsen's calculations.

Originally, the stock had to fall 50% to wipe a 100% gain. But in the second scenario, the stock had to drop only 80% to wipe out a phenomenal 400% gain. This growing discrepancy between the different averaging techniques highlights the importance of accurately measuring and portraying investment results. Again we see that the geometric average portrays the true return accurately.

Annualizing Returns

An annualized holding period return figure can be computed by taking the $1/n^{th}$ root of the holding period return, where n is the length of the sub-period relative to the year. (For a three-month period, n would equal .25, or one-fourth of the year. For a two-year period, n would equal 2.) Below are two examples that show how this operation is performed.

Let's say you wanted to figure out the annualized return of a stock that rose 5% in the first quarter. The annualized return would then be computed as $(1.05)^{1/.25}$, or 21.6%.

We can also compute an average annualized return figure from a period longer than a year. For example, if the stock rose 20% for two straight years, the cumulative growth rate would be 44% (1.20 * 1.20). This figure could be dissected into the average annual rate using the same formula shown above $(1.44)^{1/2}$, which we can verify as 1.20, or 20%.

Roger J. Bos
Analyst

harmonic. These formulas are shown below:

The holding period return is independent of time. That means that it can be computed on an annual basis, over a ten-year period, or any other time frame.

Arithmetic:	$(y_1 + y_2 + \ldots + y_n)/n$
Geometric:	$(((1+y_1) * (1+y_2) * \ldots * (1+y_n)) - 1)^{1/n}$
Harmonic:	$(1/((1/n) * ((1+y_1)+(1+y_2)+\ldots+(1+y_n)))) - 1$

In each case n is the number of years of data and each y is the ending price divided by the beginning price minus 1. Stated simply, the geometric mean is the n^{th} root of the product of the individual averages. Since there are often negative returns involved in this sort of calculation, one is added to each term. At the end, the one is subtracted to get back to the decimal fraction number.

The arithmetic average has an upward bias, though it is the simplest to calculate. The geometric average does not have any bias, and thus is best to use when compounding (over a number of years) is involved. Lastly, the harmonic average has a downward bias.

Compounding: Averages Over a Number of Years

Now assume we have been watching a stock for two years, and we want to compute the annual return for each year, and the average annual return for the two-year period. Let's say this stock was initially priced at $10, rose to $20 by the end of year 1, but fell back down to $10 by the end of year two. From the above-mentioned example, we know how to find the price change for the first and second year. Then we can also find the total price change over the two year period.

One of the more interesting observations that arises from such an example is the asymmetric nature of the returns. Notice that in this example, the stock only has to fall half as much in year two as it rose in year one to completely wipe out any paper gains the investor had during the interim. This nature highlights the importance of using the geometric return. As shown, the arithmetic average indicates that the stock had an average annual return of 25% over the past two years. However, the true return, which is corroborated by the geometric mean, is zero.

Another interesting point is that the asymmetry magnifies as the price changes increase in size. For example, let's say the stock price increased to $50 before falling back to $10.

Year	Price	% Price Change
0	$10	—
1	50	400%
2	10	-80%

Price change from year 0 to year 2: 0%

Arithmetic Average:	160%
Geometric Average:	0%

Originally, the stock had to fall 50% to wipe a 100% gain. But in the second scenario, the stock had to drop only 80% to wipe out a phenomenal 400% gain. This growing discrepancy between the different averaging techniques highlights the importance of accurately measuring and portraying investment results. Again we see that the geometric average portrays the true return accurately.

Annualizing Returns

An annualized holding period return figure can be computed by taking the $1/n^{th}$ root of the holding period return, where n is the length of the sub-period relative to the year. (For a three-month period, n would equal .25, or one-fourth of the year. For a two-year period, n would equal 2.) Below are two examples that show how this operation is performed.

Let's say you wanted to figure out the annualized return of a stock that rose 5% in the first quarter. The annualized return would then be computed as $(1.05)^{1/.25}$, or 21.6%.

We can also compute an average annualized return figure from a period longer than a year. For example, if the stock rose 20% for two straight years, the cumulative growth rate would be 44% (1.20 * 1.20). This figure could be dissected into the average annual rate using the same formula shown above $(1.44)^{1/2}$, which we can verify as 1.20, or 20%.

Roger J. Box
Analyst

Schedule JAR 1

DELMARVA POWER & LIGHT
Overall Cost of Capital

Recommended Capital Structure	Ratios	Cost Rate	Weighted Cost Rate [D]
Long-Term Debt	**52.48%** [A]	**5.08%** [B]	2.66%
Short-Term Debt			
Common Equity	**47.52%** [A]	9.50% [C]	4.51%
	100.0%		7.18%

Recommended capital structure With adjustment for lower risk of revenue decoupling	Ratios 0.00%	Cost Rate	Weighted Cost Rate [D]
Debt	52.48% [A]	5.08% [B]	2.66%
Common Equity	47.52% [A]	8.50% [E]	4.04%
	100.0%		6.70%

Source:

[A] Morin's Direct Testimony, Schedule RAM-14
[B] Schedule JAR 7, Page 2
[C] Schedule JAR 2 Midppont of range of 9.15% to 9.70%, rounded up.
[D] Cost Rate X Ratio
[E] Cost of equity without revenue decoupling minus mid-point of 0.5% to 1.5% range as discussed in text of testimony.

Schedule JAR 2

DELMARVA POWER & LIGHT
COST OF EQUITY SUMMARY

SIMPLIFIED, OR CONSTANT GROWTH DCF (D/P +g) RESULTS:	**Average for Year ending 12/31/09**		**As of 12/31/2009**	
Combination of Gas & Electric Utilities	9.86%	[A]	9.55%	[A]

Risk Premium/Capital Asset Pricing Model

Combination of Gas & Electric Utilities		
Average of CAPM Methods	9.12%	[B]

	High	Low	
Recommended Equity Cost Rate	9.85%	9.30%	[C]
Adjustment for Capital Structure	-0.15%	-0.15%	[D]
Recommended cost of equity	9.70%	9.15%	

Source:

[A] Schedule JAR 5, Page 1
[B] Schedule JAR 8, Page 1
[C] There is no one correct way to establish a range. The range I have shown gives greater weight to the DCF results.
[D] Based on estimate of 0.04% change in cost of equity for each 1% change in common equity ratio. The difference between the 47.52% common equity component and the 43.78% being used by the comparative group is 3.74%. 3.74% X .04% is 0.15% The same computation applied to the capital struture requested by the Company would result in a cost of equity adjustment for capital structure of 0.15%.

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
		Book Value Per Sh. Dec. 06	Book Value Per Sh. Dec. 07	Book Value Per Sh. Dec. 08	Book Value Per Sh. Dec. 09 Est.	Book Value Per Sh. 2012-2014	Market Price At 12/31/09	Market Price High for Year	Market Price Low for Year	Market to Book At 12/31/09	Market to Book Avg. for Year	2009 Div. Rate	Dividend Yield At 12/31/2009	Dividend Yield Avg. for Year
		[A]	[A]	[A]	[A]	[A]	[B]	[B]	[B]	[C]	[C]	[A]	[D]	[D]
COMBINATION OF GAS & ELECTRIC UTILITIES														
WITNESS MORIN'S GROUP														
ALLETE	ALE	$21.90	$24.11	$25.37	$25.35	$28.25	$32.29	$35.29	$23.35	1.27	1.16	$1.76	5.45%	6.00%
Alliant Energy	LNT	$22.83	$24.30	$25.56	$27.05	$31.05	$30.26	$31.53	$20.31	1.12	0.99	$1.50	4.96%	5.79%
Ameren Corp	AEE	$31.86	$32.41	$32.80	$33.10	$37.25	$27.95	$35.35	$19.51	0.84	0.83	$1.54	5.51%	5.61%
CMS Energy Corp.	CMS	$10.03	$9.46	$10.88	$11.60	$14.25	$15.66	$16.13	$9.98	1.35	1.16	$0.50	3.19%	3.83%
Consol. Edison	ED	$31.09	$32.58	$35.43	$36.10	$41.05	$45.43	$46.35	$32.56	1.26	1.10	$2.36	5.19%	5.98%
DTE Energy	DTE	$33.02	$35.86	$36.77	$37.45	$42.50	$43.59	$44.96	$23.32	1.16	0.92	$2.12	4.86%	6.21%
Duke Energy	DUK	$20.77	$16.80	$16.50	$16.25	$17.25	$17.21	$17.94	$11.72	1.06	0.91	$0.96	5.58%	6.47%
Empire Dist. Elec.	EDE	$15.49	$16.04	$15.56	$15.50	$17.25	$18.73	$19.36	$11.92	1.21	1.01	$1.28	6.83%	8.18%
Entergy Corp.	ETR	$40.45	$40.71	$42.07	$41.95	$57.50	$81.84	$86.61	$59.87	1.95	1.74	$3.00	3.67%	4.10%
Exelon Corp.	EXC	$14.89	$15.34	$16.79	$18.80	$26.25	$48.87	$58.98	$38.41	2.60	2.74	$2.10	4.30%	4.31%
MGE Energy	MGEE	$17.89	$19.49	$20.88	$21.50	$21.05	$35.74	$38.23	$27.27	1.66	1.55	$1.47	4.12%	4.50%
Northeast Utilities	NU	$18.14	$18.65	$19.38	$20.30	$24.50	$25.79	$26.48	$19.01	1.27	1.15	$0.95	3.68%	4.18%
North Western Corp														
NSTAR	NST	$14.82	$15.95	$16.74	$17.60	$22.00	$36.80	$37.75	$27.49	2.09	1.90	$1.50	4.08%	4.60%
NV Energy Inc.	NVE	$11.86	$12.82	$13.36	$13.80	$16.50	$12.38	$12.76	$7.96	0.90	0.76	$0.40	3.23%	3.86%
PG&E Corp.	PCG	$22.44	$24.18	$25.97	$27.60	$35.75	$44.65	$45.79	$34.50	1.62	1.50	$1.68	3.76%	4.18%
Public Serv. Enterprise	PEG	$13.35	$14.35	$15.36	$17.00	$24.00	$33.25	$34.14	$23.65	1.96	1.79	$1.33	4.00%	4.60%
TECO Energy	TE	$8.25	$9.56	$9.43	$9.65	$11.75	$16.22	$16.71	$8.41	1.68	1.32	$0.80	4.93%	6.37%
UniSource Energy	UNS	$18.59	$19.54	$19.16	$21.25	$28.95	$32.19	$33.25	$22.76	1.51	1.39	$1.16	3.60%	4.14%
Wisconsin Energy	WEC	$24.70	$26.50	$28.54	$30.20	$38.00	$49.83	$50.62	$36.31	1.65	1.48	$1.35	2.71%	3.11%
Xcel Energy Inc.	XEL	$14.28	$14.70	$15.35	$15.90	$19.00	$21.22	$21.94	$16.01	1.33	1.21	$0.98	4.62%	5.16%
Avista Corp.	AVA	$17.46	$17.27	$18.30	$18.95	$21.50	$21.59	$22.44	$12.67	1.14	0.94	$0.84	3.89%	4.78%
	AVERAGE	$20.20	$20.98	$21.91	$22.71	$27.41	$32.93	$34.89	$23.19	1.46	1.31	$1.41	4.39%	5.05%
	MEDIAN									1.33	1.16		4.12%	4.60%

est= Estimated by Value Line

Sources:
- [A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.
- [B] Yahoo Finance -- Historical Prices
- [C] Market price divided by book value
- [D] Dividend rate divided by market price

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
		Book Value	Book Value	Book Value	Book Value	Book Value	Market Price			Market to Book			Dividend Yield	
		Per Sh. Dec. 06	Per Sh. Dec. 07	Per Sh. Dec. 08	Per Sh. Dec. 09 Est.	Per Sh. 2012-2014	At 12/31/09	High for Year	Low for Year	At 12/31/09	Avg. for Year	2009 Div. Rate	At 12/31/2009	Avg. for Year
		[A]	[A]	[A]	[A]	[A]	[B]	[B]	[B]	[C]	[C]	[A]	[D]	[D]
S&P UTILITY INDEX ELECTRIC UTILITIES														
WITNESS MORIN'S GROUP														
Allegheny Energy	AYE	$12.58	$15.16	$16.83	$18.70	$25.90	$23.48	$35.97	$20.32	1.26	1.58	$0.60	2.56%	2.13%
Ameren Corp	AEE	$31.86	$32.41	$32.80	$33.10	$37.25	$27.95	$35.35	$19.51	0.84	0.83	$1.54	5.51%	5.61%
CMS Energy Corp.	CMS	$10.03	$9.46	$10.88	$11.60	$14.25	$15.66	$16.13	$9.98	1.35	1.16	$0.50	3.19%	3.83%
CenterPoint Energy	CNP	$4.96	$5.61	$5.89	$6.75	$9.00	$14.51	$14.87	$8.66	2.15	1.86	$0.76	5.24%	6.46%
Consol. Edison	ED	$31.09	$32.58	$35.43	$36.10	$41.05	$45.43	$46.35	$32.56	1.26	1.10	$2.36	5.19%	5.98%
DTE Energy	DTE	$33.02	$35.86	$36.77	$37.45	$42.50	$43.59	$44.96	$23.32	1.16	0.92	$2.12	4.86%	6.21%
Dominion Resources	D	$18.50	$16.31	$17.28	$18.50	$26.00	$38.92	$39.57	$27.15	2.10	1.86	$1.75	4.50%	5.25%
Duke Energy	DUK	$20.77	$16.80	$16.50	$16.25	$17.25	$17.21	$17.94	$11.72	1.06	0.91	$0.96	5.58%	6.47%
Edison Int'l	EIX	$23.66	$25.92	$29.21	$30.10	$39.75	$34.78	$36.72	$23.09	1.16	1.01	$1.24	3.57%	4.15%
Entergy Corp.	ETR	$40.45	$40.71	$42.07	$41.95	$57.50	$81.84	$86.61	$59.87	1.95	1.74	$3.00	3.67%	4.10%
Exelon Corp.	EXC	$14.89	$15.34	$16.79	$18.80	$26.25	$48.87	$58.98	$38.41	2.60	2.74	$2.10	4.30%	4.31%
FPL Group	FPL	$24.49	$26.35	$28.57	$30.85	$41.25	$52.82	$60.61	$41.48	1.71	1.72	$1.89	3.58%	3.70%
FirstEnergy Corp.	FE	$28.30	$29.45	$27.17	$28.25	$35.75	$46.45	$53.63	$35.26	1.64	1.60	$2.20	4.74%	4.95%
Integrys Energy	TEG	$35.61	$42.58	$40.79	$37.00	$39.00	$41.99	$45.10	$19.44	1.13	0.83	$2.72	6.48%	8.43%
NiSource Inc.	NI	$18.32	$18.52	$17.24	$17.30	$18.55	$15.38	$15.82	$7.79	0.89	0.68	$0.92	5.98%	7.79%
PG&E Corp.	PCG	$22.44	$24.18	$25.97	$27.60	$35.75	$44.65	$45.79	$34.50	1.62	1.50	$1.68	3.76%	4.18%
PPL Corp.	PPL	$13.30	$14.88	$13.55	$13.30	$19.50	$32.31	$34.42	$24.25	2.43	2.19	$1.38	4.27%	4.70%
Pepco Holdings	POM	$18.82	$20.04	$19.14	$19.50	$20.75	$16.85	$18.71	$10.07	0.86	0.74	$1.08	6.41%	7.51%
Pinnacle West Capital	PNW	$34.48	$35.15	$34.16	$33.05	$37.25	$36.58	$37.96	$22.32	1.11	0.90	$2.10	5.74%	6.97%
Progress Energy	PGN	$32.37	$32.38	$32.55	$31.90	$36.80	$41.01	$42.20	$31.35	1.29	1.14	$2.48	6.05%	6.74%
Public Serv. Enterprise	PEG	$13.35	$14.35	$15.36	$17.00	$24.00	$33.25	$34.14	$23.65	1.96	1.79	$1.33	4.00%	4.60%
Sempra Energy	SRE	$28.66	$31.87	$32.75	$35.75	$51.25	$55.98	$57.18	$36.43	1.57	1.37	$1.56	2.79%	3.33%
Southern Co.	SO	$15.24	$16.23	$17.08	$18.05	$21.75	$33.32	$37.62	$26.48	1.85	1.82	$1.75	5.25%	5.46%
TECO Energy	TE	$8.25	$9.56	$9.43	$9.65	$11.75	$16.22	$16.71	$8.41	1.68	1.32	$0.80	4.93%	6.37%
Wisconsin Energy	WEC	$24.70	$26.50	$28.54	$30.20	$38.00	$49.83	$50.62	$36.31	1.65	1.48	$1.35	2.71%	3.11%
Xcel Energy Inc.	XEL	$14.28	$14.70	$15.35	$15.90	$19.00	$21.22	$21.94	$16.01	1.33	1.21	$0.98	4.62%	5.16%
	AVERAGE	$22.09	$23.19	$23.77	$24.41	$30.27	$35.77	$38.69	$24.94	1.52	1.39	$1.58	4.59%	5.29%
	MEDIAN									1.46	1.34		4.68%	5.21%

est= Estimated by Value Line

Sources:
- [A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.
- [B] Yahoo Finance -- Historical Prices
- [C] Market price divided by book value
- [D] Dividend rate divided by market price

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]
		Book Value Per Sh. Dec. 06	Book Value Per Sh. Dec. 07	Book Value Per Sh. Dec. 08	Book Value Per Sh. Dec. 09 Est.	Book Value Per Sh. 2012-2014	Market Price At 12/31/09	Market Price High for Year	Market Price Low for Year	Market to Book At 12/31/09	Market to Book Avg. for Year	Div. Rate	Dividend Yield At 12/31/2009	Dividend Yield Avg. for Year
		[A]	[A]	[A]	[A]	[A]	[B]	[B]	[B]	[C]	[C]	[A]	[D]	[D]
S&P UTILITY INDEX ELECTRIC UTILITIES														
MORE THAN 50% OF REVENUES FROM REGULATED ACTIVITIES														
WITNESS MORIN'S GROUP														
Allegheny Energy	AYE	$12.58	$15.16	$16.83	$18.70	$25.90	$23.48	$35.97	$20.32	1.26	1.58	$0.60	2.56%	2.13%
Ameren Corp	AEE	$31.86	$32.41	$32.80	$33.10	$37.25	$27.95	$35.35	$19.51	0.84	0.83	$1.54	5.51%	5.61%
CMS Energy Corp.	CMS	$10.03	$9.46	$10.88	$11.60	$14.25	$15.66	$16.13	$9.98	1.35	1.16	$0.50	3.19%	3.83%
Consol. Edison	ED	$31.09	$32.58	$35.43	$36.10	$41.05	$45.43	$46.35	$32.56	1.26	1.10	$2.36	5.19%	5.98%
DTE Energy	DTE	$33.02	$35.86	$36.77	$37.45	$42.50	$43.59	$44.96	$23.32	1.16	0.92	$2.12	4.86%	6.21%
Duke Energy	DUK	$20.77	$16.80	$16.50	$16.25	$17.25	$17.32	$17.94	$11.72	1.07	0.91	$0.96	5.54%	6.47%
Edison Int'l	EIX	$23.66	$25.92	$29.21	$30.10	$39.75	$34.78	$36.72	$23.09	1.16	1.01	$1.24	3.57%	4.15%
Entergy Corp.	ETR	$40.45	$40.71	$42.07	$41.95	$57.50	$81.84	$86.61	$59.87	1.95	1.74	$3.00	3.67%	4.10%
Exelon Corp.	EXC	$14.89	$15.34	$16.79	$18.80	$26.25	$48.87	$58.98	$38.41	2.60	2.74	$2.10	4.30%	4.31%
FPL Group	FPL	$24.49	$26.35	$28.57	$30.85	$41.25	$52.82	$60.61	$41.48	1.71	1.72	$1.89	3.58%	3.70%
FirstEnergy Corp.	FE	$28.30	$29.45	$27.17	$28.25	$35.75	$46.45	$53.63	$35.26	1.64	1.60	$2.20	4.74%	4.95%
PG&E Corp.	PCG	$22.44	$24.18	$25.97	$27.60	$35.75	$44.65	$45.79	$34.50	1.62	1.50	$1.68	3.76%	4.18%
Pepco Holdings	POM	$18.82	$20.04	$19.14	$19.50	$20.75	$16.85	$18.71	$10.07	0.86	0.74	$1.08	6.41%	7.51%
Pinnacle West Capital	PNW	$34.48	$35.15	$34.16	$33.05	$37.25	$36.58	$37.96	$22.32	1.11	0.90	$2.10	5.74%	6.97%
Progress Energy	PGN	$32.37	$32.38	$32.55	$31.90	$36.80	$41.01	$42.20	$31.35	1.29	1.14	$2.48	6.05%	6.74%
Public Serv. Enterprise	PEG	$13.35	$14.35	$15.36	$17.00	$24.00	$33.25	$34.14	$23.65	1.96	1.79	$1.33	4.00%	4.60%
Southern Co.	SO	$15.24	$16.23	$17.08	$18.05	$21.75	$33.32	$37.62	$27.19	1.85	1.84	$1.75	5.25%	5.40%
TECO Energy	TE	$8.25	$9.56	$9.43	$9.65	$11.75	$16.22	$16.71	$8.41	1.68	1.32	$0.80	4.93%	6.37%
Wisconsin Energy	WEC	$24.70	$26.50	$28.54	$30.20	$38.00	$49.83	$50.62	$36.31	1.65	1.48	$1.35	2.71%	3.11%
Xcel Energy Inc.	XEL	$14.28	$14.70	$15.35	$15.90	$19.00	$21.22	$21.94	$16.01	1.33	1.21	$0.98	4.62%	5.16%
	AVERAGE	$22.75	$23.66	$24.53	$25.30	$31.19	$36.56	$39.95	$26.27	1.47	1.36	$1.60	4.51%	5.07%
	MEDIAN									1.34	1.27		4.68%	5.06%

est= Estimated by Value Line

Sources:
- [A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.
- [B] Yahoo Finance -- Historical Prices
- [C] Market price divided by book value
- [D] Dividend rate divided by market price

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[13]
	EPS 2006	EPS 2007	EPS 2008	EPS 2009 Est.	EPS Average 2006 - 2009	EPS 2012 - 2014 Est.	EPS Compound Annual Increase 2009- (2012-2014)	Return on Eq. 2008	Return on Eq. 2009	Value Line Future Exp. Return on Eq.	Value Line EPS Exp.	Return on Equity 2007
	[A]	[A]	[A]	[A]	[B]	[A]	[C]	[D]	[D]	[A]	[E]	[B]
COMBINATION OF GAS & ELECTRIC UTILITIES EARNINGS PER SHARE AND RETURN ON EQUITY												
ALLETE	$2.77	$3.08	$2.82	$1.90	$2.64	$2.75		11.40%	7.49%	9.00%	$2.54	13.39%
Alliant Energy	$2.06	$2.69	$2.54	$1.85	$2.29	$3.10		10.19%	7.03%	10.00%	$3.11	11.42%
Ameren Corp	$2.66	$2.98	$2.88	$2.75	$2.82	$3.00		8.83%	8.35%	8.00%	$2.98	9.27%
CMS Energy Corp.	$0.64	$0.64	$1.23	$1.15	$0.92	$1.50		12.09%	10.23%	10.50%	$1.50	6.57%
Consol. Edison	$2.95	$3.48	$3.36	$3.15	$3.24	$3.85		9.88%	8.81%	9.50%	$3.90	10.93%
DTE Energy	$2.45	$2.66	$2.73	$3.25	$2.77	$4.25		7.52%	8.76%	10.00%	$4.25	7.72%
Duke Energy	$0.92	$1.20	$1.01	$1.10	$1.06	$1.40		6.07%	6.72%	8.00%	$1.38	6.39%
Empire Dist. Elec.	$1.41	$1.09	$1.17	$1.20	$1.22	$1.75		7.41%	7.73%	10.50%	$1.81	6.91%
Entergy Corp.	$5.36	$5.60	$6.20	$5.80	$5.74	$8.00		14.98%	13.81%	14.50%	$8.34	13.80%
Exelon Corp.	$3.50	$4.03	$4.10	$4.30	$3.98	$5.00		25.52%	24.16%	19.00%	$4.99	26.66%
MGE Energy	$2.06	$2.27	$2.38	$2.15	$2.22	$2.80		11.79%	10.15%	12.00%	$2.53	12.15%
Northeast Utilities	$0.82	$1.59	$1.86	$1.85	$1.53	$2.25		9.78%	9.32%	9.50%	$2.33	8.64%
North Western Corp												
NSTAR	$1.93	$2.07	$2.22	$2.35	$2.14	$3.25		13.58%	13.69%	15.00%	$3.30	13.45%
NV Energy Inc.	$1.14	$0.89	$0.89	$0.85	$0.94	$1.50		6.80%	6.26%	9.50%	$1.57	7.21%
PG&E Corp.	$2.76	$2.78	$3.22	$3.15	$2.98	$4.25		12.84%	11.76%	12.00%	$4.29	11.93%
Public Serv. Enterprise	$1.85	$2.59	$2.90	$2.95	$2.57	$3.75		19.52%	18.23%	15.50%	$3.72	18.70%
TECO Energy	$1.17	$1.27	$0.77	$1.00	$1.05	$1.40		8.11%	10.48%	12.00%	$1.41	14.26%
UniSource Energy	$1.85	$1.55	$0.39	$2.70	$1.62	$3.25		2.02%	13.36%	11.00%	$3.18	8.13%
Wisconsin Energy	$2.64	$2.84	$3.03	$3.10	$2.90	$4.50		11.01%	10.55%	11.50%	$4.37	11.09%
Xcel Energy Inc.	$1.35	$1.35	$1.46	$1.50	$1.42	$2.00		9.72%	9.60%	10.50%	$2.00	9.32%
Avista Corp.	$1.47	$0.72	$1.36	$1.55	$1.28	$1.75		7.65%	8.32%	8.50%	$1.83	4.15%
	$2.08	$2.26	$2.31	$2.36	$2.25	$3.11	7.12%	10.80%	10.71%	11.24%	$3.11	11.05%
								9.88%	9.60%	10.50%		10.93%

est= Estimated by Value Line

Source:
[A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.
[B] Average of EPS from 2006-2009
[C] ((2012-2014 EPS)/(2009 EPS))^1/4 - 1
[D] Earnings Per Share divided by average book value. Book value shown on Schedule JAR 3, Page 1
[E] Value Line Future Exp. Return on Eq. X Value Future Expected Book Value
Value Line Future Expected Return on Book Equity Reduced by 100 basis points X Value Book Value forecast Book Value for 2012 - 2014

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[13]
		EPS 2006	EPS 2007	EPS 2008	EPS 2009 Est.	EPS Average 2006 - 2009	EPS 2012 - 2014 Est.	EPS Compound Annual Increase 2009- (2012-2014)	Return on Eq. 2008	Return on Eq. 2009	Value Line Future Exp. Return on Eq.	Value Line EPS Exp.	Return on Equity 2007
		[A]	[A]	[A]	[A]	[B]	[A]	[B]	[C]	[C]	[A]	[E]	[B]
S&P UTILITY INDEX ELECTRIC UTILITIES													
EARNINGS PER SHARE AND RETURN ON EQUITY													
Allegheny Energy	AYE	**$1.89**	**$2.42**	**$2.33**	**$2.25**	$2.22	**$3.35**		14.57%	12.67%	**13.00%**	$3.37	17.45%
Ameren Corp	AEE	**$2.66**	**$2.98**	**$2.88**	**$2.75**	$2.82	**$3.00**		8.83%	8.35%	**8.00%**	$2.98	9.27%
CMS Energy Corp.	CMS	**$0.64**	**$0.64**	**$1.23**	**$1.15**	$0.92	**$1.50**		12.09%	10.23%	**10.50%**	$1.50	6.57%
CenterPoint Energy	CNP	**$1.33**	**$1.17**	**$1.30**	**$1.00**	$1.20	**$1.50**		22.61%	15.82%	**16.50%**	$1.49	22.14%
Consol. Edison		**$2.95**	**$3.48**	**$3.36**	**$3.15**	$3.24	**$3.85**		9.88%	8.81%	**9.50%**	$3.90	10.93%
DTE Energy	DTE	**$2.45**	**$2.66**	**$2.73**	**$3.25**	$2.77	**$4.25**		7.52%	8.76%	**10.00%**	$4.25	7.72%
Dominion Resources	D	**$2.40**	**$2.13**	**$3.04**	**$2.90**	$2.62	**$4.00**		18.10%	16.21%	**15.50%**	$4.03	12.24%
Duke Energy	DUK	**$0.92**	**$1.20**	**$1.01**	**$1.10**	$1.06	**$1.40**		6.07%	6.72%	**8.00%**	$1.38	6.39%
Edison Int"l	EIX	**$3.28**	**$3.32**	**$3.68**	**$3.10**	$3.35	**$4.50**		13.35%	10.45%	**11.50%**	$4.57	13.39%
Entergy Corp.	ETR	**$5.36**	**$5.60**	**$6.20**	**$5.80**	$5.74	**$8.00**		14.98%	13.81%	**14.50%**	$8.34	13.80%
Exelon Corp.	EXC	**$3.50**	**$4.03**	**$4.10**	**$4.30**	$3.98	**$5.00**		25.52%	24.16%	**19.00%**	$4.99	26.66%
FPL Group	FPL	**$3.23**	**$3.27**	**$4.07**	**$3.90**	$3.62	**$5.00**		14.82%	13.13%	**12.00%**	$4.95	12.86%
FirstEnergy Corp.	FE	**$3.82**	**$4.22**	**$4.38**	**$3.30**	$3.93	**$5.00**		15.47%	11.91%	**14.50%**	$5.18	14.61%
Integrys Energy	TEG	**$3.51**	**$2.48**	**$1.58**	**$2.35**	$2.48	**$3.50**		3.79%	6.04%	**9.00%**	$3.51	6.34%
NiSource Inc.	NI	**$1.14**	**$1.14**	**$1.34**	**$1.00**	$1.16	**$1.35**		7.49%	5.79%	**7.50%**	$1.39	6.19%
PG&E Corp.	PCG	**$2.76**	**$2.78**	**$3.22**	**$3.15**	$2.98	**$4.25**		12.84%	11.76%	**12.00%**	$4.29	11.93%
PPL Corp.	PPL	**$2.29**	**$2.63**	**$2.45**	**$1.15**	$2.13	**$3.75**		17.24%	8.57%	**19.50%**	$3.80	18.67%
Pepco Holdings	POM	**$1.33**	**$1.53**	**$1.93**	**$0.95**	$1.44	**$1.60**		9.85%	4.92%	**7.50%**	$1.56	7.87%
Pinnacle West Capita	PNW	**$3.17**	**$2.96**	**$2.12**	**$2.45**	$2.68	**$3.25**		6.12%	7.29%	**9.00%**	$3.35	8.50%
Progress Energy	PGN	**$2.05**	**$2.69**	**$2.96**	**$3.05**	$2.69	**$3.60**		9.12%	9.46%	**9.50%**	$3.50	8.31%
Public Serv. Enterpris	PEG	**$1.85**	**$2.59**	**$2.90**	**$2.95**	$2.57	**$3.75**		19.52%	18.23%	**15.50%**	$3.72	18.70%
Sempra Energy	SRE	**$4.23**	**$4.26**	**$4.43**	**$4.80**	$4.43	**$6.00**		13.71%	14.01%	**12.00%**	$6.15	14.08%
Southern Co.	SO	**$2.10**	**$2.28**	**$2.25**	**$2.30**	$2.23	**$3.00**		13.51%	13.09%	**14.00%**	$3.05	14.49%
TECO Energy	TE	**$1.17**	**$1.27**	**$0.77**	**$1.00**	$1.05	**$1.40**		8.11%	10.48%	**12.00%**	$1.41	14.26%
Wisconsin Energy	WEC	**$2.64**	**$2.84**	**$3.03**	**$3.10**	$2.90	**$4.50**		11.01%	10.55%	**11.50%**	$4.37	11.09%
Xcel Energy Inc.	XEL	**$1.35**	**$1.35**	**$1.46**	**$1.50**	$1.42	**$2.00**		9.72%	9.60%	**10.50%**	$2.00	9.32%
			$2.61	$2.72	$2.60	$2.60	$3.55	8.06%	12.53%	11.19%	12.00%	$3.58	12.45%
									12.47%	10.47%	11.75%		12.08%

est= Estimated by Value Line

Source:
[A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.
[B] ((2012-2014 EPS)/(2009 EPS))^1/4
[C] Earnings Per Share divided by average book value. Book value shown on Schedule JAR 3, Page 1

		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[13]
		EPS 2006	EPS 2007	EPS 2008	EPS 2009 Est.	EPS Average 2006 - 2009	EPS 2012 - 2014 Est.	EPS Compound Annual Increase 2009- (2012-2014)	Return on Eq. EPS	Return on Eq. EPS	Value Line Future Exp. Return on Eq.	Value Line EPS Exp.	Return on Equity EPS
		[A]	[A]	[A]	[A]	[B]	[A]	[B]	[C]	[C]	[A]	[E]	[B]
S&P UTILITY INDEX ELECTRIC UTILITIES													
MORE THAN 50% OF REVENUES FROM REGULATED ACTIVITIES													
WITNESS MORIN'S GROUP													
Allegheny Energy	AYE	**$1.89**	**$2.42**	**$2.33**	**$2.25**	$2.22	**$3.35**		14.57%	12.67%	**13.00%**	$3.37	17.45%
Ameren Corp	AEE	**$2.66**	**$2.98**	**$2.88**	**$2.75**	$2.82	**$3.00**		8.83%	8.35%	**8.00%**	$2.98	9.27%
CMS Energy Corp.	CMS	**$0.64**	**$0.64**	**$1.23**	**$1.15**	$0.92	**$1.50**		12.09%	10.23%	**10.50%**	$1.50	6.57%
Consol. Edison	ED	**$2.95**	**$3.48**	**$3.36**	**$3.15**	$3.24	**$3.85**		9.88%	8.81%	**9.50%**	$3.90	10.93%
DTE Energy	DTE	**$2.45**	**$2.66**	**$2.73**	**$3.25**	$2.77	**$4.25**		7.52%	8.76%	**10.00%**	$4.25	7.72%
Duke Energy	DUK	**$0.92**	**$1.20**	**$1.01**	**$1.10**	$1.06	**$1.40**		6.07%	6.72%	**8.00%**	$1.38	6.39%
Edison Int'l	EIX	**$3.28**	**$3.32**	**$3.68**	**$3.10**	$3.35	**$4.50**		13.35%	10.45%	**11.50%**	$4.57	13.39%
Entergy Corp.	ETR	**$5.36**	**$5.60**	**$6.20**	**$5.80**	$5.74	**$8.00**		14.98%	13.81%	**14.50%**	$8.34	13.80%
Exelon Corp.	EXC	**$3.50**	**$4.03**	**$4.10**	**$4.30**	$3.98	**$5.00**		25.52%	24.16%	**19.00%**	$4.99	26.66%
FPL Group	FPL	**$3.23**	**$3.27**	**$4.07**	**$3.90**	$3.62	**$5.00**		14.82%	13.13%	**12.00%**	$4.95	12.86%
FirstEnergy Corp.	FE	**$3.82**	**$4.22**	**$4.38**	**$3.30**	$3.93	**$5.00**		15.47%	11.91%	**14.50%**	$5.18	14.61%
PG&E Corp.	PCG	**$2.76**	**$2.78**	**$3.22**	**$3.15**	$2.98	**$4.25**		12.84%	11.76%	**12.00%**	$4.29	11.93%
Pepco Holdings	POM	**$1.33**	**$1.53**	**$1.93**	**$0.95**	$1.44	**$1.60**		9.85%	4.92%	**7.50%**	$1.56	7.87%
Pinnacle West Capita	PNW	**$3.17**	**$2.96**	**$2.12**	**$2.45**	$2.68	**$3.25**		6.12%	7.29%	**9.00%**	$3.35	8.50%
Progress Energy	PGN	**$2.05**	**$2.69**	**$2.96**	**$3.05**	$2.69	**$3.60**		9.12%	9.46%	**9.50%**	$3.50	8.31%
Public Serv. Enterpris	PEG	**$1.85**	**$2.59**	**$2.90**	**$2.95**	$2.57	**$3.75**		19.52%	18.23%	**15.50%**	$3.72	18.70%
Southern Co.	SO	**$2.10**	**$2.28**	**$2.25**	**$2.30**	$2.23	**$3.00**		13.51%	13.09%	**14.00%**	$3.05	14.49%
TECO Energy	TE	**$1.17**	**$1.27**	**$0.77**	**$1.00**	$1.05	**$1.40**		8.11%	10.48%	**12.00%**	$1.41	14.26%
Wisconsin Energy	WEC	**$2.64**	**$2.84**	**$3.03**	**$3.10**	$2.90	**$4.50**		11.01%	10.55%	**11.50%**	$4.37	11.09%
Xcel Energy Inc.	XEL	**$1.35**	**$1.35**	**$1.46**	**$1.50**	$1.42	**$2.00**		9.72%	9.60%	**10.50%**	$2.00	9.32%
			$2.71	$2.83	$2.73	$2.68	$3.61	7.28%	12.14%	11.22%	11.60%	$3.63	12.21%
									11.55%	10.47%	11.50%		11.51%

est= Estimated by Value Line

Source: [A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.
[B] Earnings Per Share divded by average book value. Book value shown on Schedule JAR 3, Page 1

RETURN ON EQUITY IMPLIED IN ZACKS NEXT FIVE YEAR GROWTH RATES

		[1] Dec. 09 Y/E Book [3]	[2] Earnings 2009	[3] Dividends	[4] Analyst 5 Year Growth Rate 10/	[5] Y/E Book in 2013 at Zack's Growth Before SV	[5] Y/E Book in 2014 at Zack's Growth Before SV	[6] Growth In Book Value From SV	[7] Y/E Book in 2014 at Zack's Growth Including SV	Earnings 2014 at Zack's Growth	[8] Return on Equity to achieve Analysts' Growth	[9] VALUE LINE BETA
		[A]	[A]	[A]	[B]	[C]	[C]	[D]	[E]	[C]	[C]	[A]
COMBINATION OF GAS & ELECTRIC UTILITIES EARNINGS PER SHARE AND RETURN ON EQUITY												
ALLETE	ALE	$25.35	$1.90	$1.76	**4.00%**	$25.97	$26.14	129.65%	$33.78	$2.31	6.84%	**0.70**
Alliant Energy	LNT	$27.05	$1.85	$1.50	**3.00%**	$28.56	$28.96	105.70%	$30.40	$2.14	7.05%	**0.70**
Ameren Corp	AEE	$33.10	$2.75	$1.54	**4.00%**	$38.44	$39.92	105.59%	$41.37	$3.35	8.09%	**0.80**
CMS Energy Corp.	CMS	$11.60	$1.15	$0.50	**5.80%**	$14.60	$15.46	105.32%	$15.83	$1.52	9.63%	**0.80**
Consol. Edison	ED	$36.10	$3.15	$2.36	**3.60%**	$39.55	$40.50	104.11%	$41.67	$3.76	9.02%	**0.65**
DTE Energy	DTE	$37.45	$3.25	$2.12	**4.50%**	$42.50	$43.91	109.56%	$47.33	$4.05	8.56%	**0.75**
Duke Energy	DUK	$16.25	$1.10	$0.96	**4.30%**	$16.87	$17.05	100.91%	$17.11	$1.36	7.93%	**0.65**
Empire Dist. Elec.	EDE	$15.50	$1.20	$1.28	**0.00%**	$15.18	$15.10	114.53%	$17.34	$1.20	6.92%	**0.75**
Entergy Corp.	ETR	$41.95	$5.80	$3.00	**4.70%**	$54.53	$58.05	89.79%	$50.54	$7.30	14.44%	**0.70**
Exelon Corp.	EXC	$18.80	$4.30	$2.10	**2.00%**	$28.05	$30.48	89.24%	$26.12	$4.75	18.18%	**0.85**
MGE Energy	MGEE	$21.50	$2.15	$1.47	**5.00%**	$24.56	$25.42	114.90%	$28.72	$2.74	9.56%	**0.65**
Northeast Utilities	NU	$20.30	$1.85	$0.95	**8.90%**	$24.78	$26.15	109.86%	$27.98	$2.83	10.13%	**0.70**
North Western Corp												
NSTAR	NST	$17.60	$2.35	$1.50	**6.00%**	$21.54	$22.68	100.00%	$22.11	$3.14	14.22%	**0.65**
NV Energy Inc.	NVE	$13.80	$0.85	$0.40	**9.30%**	$16.06	$16.76	106.45%	$17.47	$1.33	7.59%	**0.90**
PG&E Corp.	PCG	$27.60	$3.15	$1.68	**7.70%**	$34.70	$36.83	115.71%	$41.39	$4.56	11.03%	**0.55**
Public Serv. Enterprise	PEG	$17.00	$2.95	$1.33	**3.50%**	$24.07	$25.99	93.15%	$23.31	$3.50	15.03%	**0.80**
TECO Energy	TE	$9.65	$1.00	$0.80	**10.80%**	$10.69	$11.02	103.56%	$11.24	$1.67	14.85%	**0.85**
UniSource Energy	UNS	$21.25	$2.70	$1.16	**5.00%**	$28.22	$30.18	108.20%	$31.60	$3.45	10.91%	**0.70**
Wisconsin Energy	WEC	$30.20	$3.10	$1.35	**8.70%**	$38.86	$41.52	100.00%	$40.19	$4.70	11.71%	**0.65**
Xcel Energy Inc.	XEL	$15.90	$1.50	$0.98	**5.70%**	$18.29	$18.98	102.64%	$19.13	$1.98	10.35%	**0.65**
Avista Corp.	AVA	$18.95	$1.55	$0.84	**5.00%**	$22.16	$23.07	108.22%	$24.48	$1.98	8.08%	**0.70**
		$22.71	$2.36	$1.41	5.31%	$27.06	$28.29	105.58%	$29.00	$3.03	10.48%	0.72
					5.00%						9.63%	0.70

North Western Corp. excluded because not covered by basic Value Line subscription.

Source:
- [A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.
- [B] Zacks.com Quotes and Research. 1/1/10
- [C] Projected return on equity is obtained by escalating both dividends and earnings per share by the stated growth rate, and adding earnings and subtracting dividends in each year to determine the book value.
- [D] Market to Book Ratio X Compound Annual Growth rate of increase in Common Shares Outstanding (See Schedule JAR 6, Page 1)
- [E] Growth in Book Value From SV X Average of Y/E Book at Zack's Growth Before SV for 2013 and 2014

RETURN ON EQUITY IMPLIED IN ZACKS NEXT FIVE YEAR GROWTH RATES

		[1] Dec. 09 Y/E Book [3]	[2] Earnings 2009	[3] Dividends	[4] Analyst 5 Year Growth Rate 10/	Y/E Book in 2013 at Zack's Growth Before SV	[5] Y/E Book in 2014 at Zack's Growth Before SV	[6] Growth In Book Value From SV	[7] Y/E Book in 2014 at Zack's Growth Including SV	Earnings 2014 at Zack's Growth	[8] Return on Equity to achieve Analysts' Growth	[9] VALUE LINE BETA
		[A]	[A]	[A]	[B]	[C]	[C]	[D]	[E]	[C]	[C]	[A]
S&P UTILITY INDEX ELECTRIC UTILITIES												
EARNINGS PER SHARE AND RETURN ON EQUITY												
Allegheny Energy	AYE	$18.70	$2.25	$0.60	**16.00%**	$28.40	$31.86	103.34%	$31.14	$4.73	15.18%	**0.95**
Ameren Corp	AEE	$33.10	$2.75	$1.54	**4.00%**	$38.44	$39.92	105.59%	$41.37	$3.35	8.09%	**0.80**
CMS Energy Corp.	CMS	$11.60	$1.15	$0.50	**5.80%**	$14.60	$15.46	105.32%	$15.83	$1.52	9.63%	**0.80**
CenterPoint Energy	CNP	$6.75	$1.00	$0.76	**0.00%**	$7.71	$7.95	116.55%	$9.13	$1.00	10.96%	**0.80**
Consol. Edison	ED	$36.10	$3.15	$2.36	**3.60%**	$39.55	$40.50	104.11%	$41.67	$3.76	9.02%	**0.65**
DTE Energy	DTE	$37.45	$3.25	$2.12	**4.50%**	$42.50	$43.91	109.56%	$47.33	$4.05	8.56%	**0.75**
Dominion Resources	D	$18.50	$2.90	$1.75	**5.00%**	$23.70	$25.17	110.12%	$26.91	$3.70	13.75%	**0.70**
Duke Energy	DUK	$16.25	$1.10	$0.96	**4.30%**	$16.87	$17.05	100.91%	$17.11	$1.36	7.93%	**0.65**
Edison Int'l	EIX	$30.10	$3.10	$1.24	**5.00%**	$38.52	$40.89	100.00%	$39.70	$3.96	9.96%	**0.80**
Entergy Corp.	ETR	$41.95	$5.80	$3.00	**4.70%**	$54.53	$58.05	89.79%	$50.54	$7.30	14.44%	**0.70**
Exelon Corp.	EXC	$18.80	$4.30	$2.10	**2.00%**	$28.05	$30.48	89.24%	$26.12	$4.75	18.18%	**0.85**
FPL Group	FPL	$30.85	$3.90	$1.89	**7.20%**	$40.45	$43.29	110.89%	$46.43	$5.52	11.89%	**0.75**
FirstEnergy Corp.	FE	$28.25	$3.30	$2.20	**4.00%**	$33.11	$34.45	100.00%	$33.78	$4.01	11.89%	**0.80**
Integrys Energy	TEG	$37.00	$2.35	$2.72	**0.00%**	$35.52	$35.15	107.46%	$37.97	$2.35	6.19%	**0.95**
NiSource Inc.	NI	$17.30	$1.00	$0.92	**3.00%**	$17.64	$17.74	101.27%	$17.92	$1.16	6.47%	**0.85**
PG&E Corp.	PCG	$27.60	$3.15	$1.68	**7.70%**	$34.70	$36.83	115.71%	$41.39	$4.56	11.03%	**0.55**
PPL Corp.	PPL	$13.30	$1.15	$1.38	**11.40%**	$12.09	$11.69	94.99%	$11.29	$1.97	17.47%	**0.70**
Pepco Holdings	POM	$19.50	$0.95	$1.08	**5.00%**	$18.91	$18.75	118.32%	$22.28	$1.21	5.44%	**0.80**
Pinnacle West Capital	PNW	$33.05	$2.45	$2.10	**8.00%**	$34.75	$35.27	120.58%	$42.22	$3.60	8.53%	**0.75**
Progress Energy	PGN	$31.90	$3.05	$2.48	**4.50%**	$34.45	$35.16	104.15%	$36.25	$3.80	10.49%	**0.65**
Public Serv. Enterprise	PEG	$17.00	$2.95	$1.33	**3.50%**	$24.07	$25.99	93.15%	$23.31	$3.50	15.03%	**0.80**
Sempra Energy	SRE	$35.75	$4.80	$1.56	**7.00%**	$51.14	$55.69	102.88%	$54.95	$6.73	12.25%	**0.85**
Southern Co.	SO	$18.05	$2.30	$1.75	**7.60%**	$20.70	$21.49	107.15%	$22.61	$3.32	14.67%	**0.55**
TECO Energy	TE	$9.65	$1.00	$0.80	**10.80%**	$10.69	$11.02	103.56%	$11.24	$1.67	14.85%	**0.85**
Wisconsin Energy	WEC	$30.20	$3.10	$1.35	**8.70%**	$38.86	$41.52	100.00%	$40.19	$4.70	11.71%	**0.65**
Xcel Energy Inc.	XEL	$15.90	$1.50	$0.98	**5.70%**	$18.29	$18.98	102.64%	$19.13	$1.98	10.35%	**0.65**
		$24.41	$2.60	$1.58	5.73%	$29.16	$30.55	104.51%	$31.07	$3.44	11.31%	0.75
					5.00%						10.99%	0.78

Source:
- [A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.
- [B] Zacks.com Quotes and Research. 1/1/10
- [C] Projected return on equity is obtained by escalating both dividends and earnings per share by the stated growth rate, and adding earnings and subtracting dividends in each year to determine the book value.
- [D] Market to Book Ratio X Compound Annual Growth rate of increase in Common Shares Outstanding (See Schedule JAR 6, Page 1)
- [E] Growth in Book Value From SV X Average of Y/E Book at Zack's Growth Before SV for 2013 and 2014

RETURN ON EQUITY IMPLIED IN ZACKS NEXT FIVE YEAR GROWTH RATES

		[1] Dec. 09 Y/E Book [3]	[2] Earnings 2009	[3] Dividends	[4] Analyst 5 Year Growth Rate 10/	Y/E Book in 2013 at Zack's Growth Before SV	[5] Y/E Book in 2014 at Zack's Growth Before SV	[6] Growth In Book Value From SV	[7] Y/E Book in 2014 at Zack's Growth Including SV	Earnings 2014 at Zack's Growth	[8] Return on Equity to achieve Analysts' Growth	[9] VALUE LINE BETA
		[A]	[A]	[A]	[B]	[C]	[C]	[D]	[E]	[C]	[C]	[A]
S&P UTILITY INDEX ELECTRIC UTILITIES												
MORE THAN 50% OF REVENUES FROM REGULATED ACTIVITIES												
WITNESS MORIN'S GROUP												
Allegheny Energy	AYE	$18.70	$2.25	$0.60	**16.00%**	$28.40	$31.86	103.34%	$31.14	$4.73	15.18%	**0.95**
Ameren Corp	AEE	$33.10	$2.75	$1.54	**4.00%**	$38.44	$39.92	105.59%	$41.37	$3.35	8.09%	**0.80**
CMS Energy Corp.	CMS	$11.60	$1.15	$0.50	**5.80%**	$14.60	$15.46	105.32%	$15.83	$1.52	9.63%	**0.80**
Consol. Edison	ED	$36.10	$3.15	$2.36	**3.60%**	$39.55	$40.50	104.11%	$41.67	$3.76	9.02%	**0.65**
DTE Energy	DTE	$37.45	$3.25	$2.12	**4.50%**	$42.50	$43.91	109.56%	$47.33	$4.05	8.56%	**0.75**
Duke Energy	DUK	$16.25	$1.10	$0.96	**4.30%**	$16.87	$17.05	100.92%	$17.12	$1.36	7.93%	**0.65**
Edison Int'l	EIX	$30.10	$3.10	$1.24	**5.00%**	$38.52	$40.89	100.00%	$39.70	$3.96	9.96%	**0.80**
Entergy Corp.	ETR	$41.95	$5.80	$3.00	**4.70%**	$54.53	$58.05	89.79%	$50.54	$7.30	14.44%	**0.70**
Exelon Corp.	EXC	$18.80	$4.30	$2.10	**2.00%**	$28.05	$30.48	89.24%	$26.12	$4.75	18.18%	**0.85**
FPL Group	FPL	$30.85	$3.90	$1.89	**7.20%**	$40.45	$43.29	110.89%	$46.43	$5.52	11.89%	**0.75**
FirstEnergy Corp.	FE	$28.25	$3.30	$2.20	**4.00%**	$33.11	$34.45	100.00%	$33.78	$4.01	11.89%	**0.80**
PG&E Corp.	PCG	$27.60	$3.15	$1.68	**7.70%**	$34.70	$36.83	115.71%	$41.39	$4.56	11.03%	**0.55**
Pepco Holdings	POM	$19.50	$0.95	$1.08	**5.00%**	$18.91	$18.75	118.32%	$22.28	$1.21	5.44%	**0.80**
Pinnacle West Capital	PNW	$33.05	$2.45	$2.10	**8.00%**	$34.75	$35.27	120.58%	$42.22	$3.60	8.53%	**0.75**
Progress Energy	PGN	$31.90	$3.05	$2.48	**4.50%**	$34.45	$35.16	104.15%	$36.25	$3.80	10.49%	**0.65**
Public Serv. Enterprise	PEG	$17.00	$2.95	$1.33	**3.50%**	$24.07	$25.99	93.15%	$23.31	$3.50	15.03%	**0.80**
Southern Co.	SO	$18.05	$2.30	$1.75	**7.60%**	$20.70	$21.49	107.15%	$22.61	$3.32	14.67%	**0.55**
TECO Energy	TE	$9.65	$1.00	$0.80	**10.80%**	$10.69	$11.02	103.56%	$11.24	$1.67	14.85%	**0.85**
Wisconsin Energy	WEC	$30.20	$3.10	$1.35	**8.70%**	$38.86	$41.52	100.00%	$40.19	$4.70	11.71%	**0.65**
Xcel Energy Inc.	XEL	$15.90	$1.50	$0.98	**5.70%**	$18.29	$18.98	102.64%	$19.13	$1.98	10.35%	**0.65**
		$25.30	$2.73	$1.60	6.13%	$30.52	$32.04	104.20%	$32.48	$3.63	11.34%	0.74
					5.00%						10.76%	0.75

Source:

[A] Value Line issues: 11/27/09, 12/25/09, 11/6/09.

[B] Zacks.com Quotes and Research. 1/1/10

[C] Projected return on equity is obtained by escalating both dividends and earnings per share by the stated growth rate, and adding earnings and subtracting dividends in each year to determine the book value.

[D] Market to Book Ratio X Compound Annual Growth rate of increase in Common Shares Outstanding (See Schedule JAR 6, Page 1)

[E] Growth in Book Value From SV X Average of Y/E Book at Zack's Growth Before SV for 2013 and 2014

DELMARVA POWER & LIGHT COMPANY
COMPUTATION OF EMBEDDED COST OF DEBT

	[1] Net Amount Outstanding	[2] Effective Cost Rate	[3] Annual Net Cost
Per Company Request	$ 883,699,338	5.45%	$ 48,177,158 [A]
Adjustment to lower interest rate on $250 million debt issuance from 6.40% to 5.18%			$ (3,038,388) [B]
Adjustment to lower interest rate on $100 million debt issuance from 5.00% to 4.73%.			$ (270,000) [C]
	$ 883,699,338	**5.08% [D]**	**$ 44,868,770**

Source:

[A] Company Witness Dr. Morin's Schedule RAM-16

[B] Schedule JAR 4, Page 2 , interest rate should change from 6.40% to 5.31%.
$250 million x (6.40%-5.31%)=(2,750,000)

[C] Schedule JAR 4, Page 2 , interest rate should change from 5.00% to 4.73%.
$100 million x (5.00%-4.73%)=(270,000).

[D] Column 3/Column [1]

APPROPRIATE REGULATORY INTEREST RATE ON
DELMARVA DEBT

$250 million issued on 11/25/08	AMOUNT	Source
Interest rate reported by Company	6.40%	Dr. Morin's Schedule RAM-17
Adjustments:		
If issuance had been in first quarter of 2009 instead of 11/25/08		
a) Change in long-term treasury bond rates	-0.30%	#REF!
b) Change in spread between utility debt and long-tern treasury bonds	-0.25%	Interpretation of data shown on graph from UBS provided by Company in response to Staff-COC-5
Interest Rate on $250 million issuance if it had been made during the first quarter of 2009	5.85%	
Adjustment to exclude impact of unregulated activities	-0.67%	Interpretation of data shown from Merrill Lynch for first quarter of 2009 as provided by Company in response to Staff-COC-5. Spread between A and BBB was about 2.00%. This was divided by 3 to get adjustment.
Interest rate on $250 million debt issuance if the debt issuance had been made in the first quarter of 2009 and if the rate had not been influenced by unregulated activities.		
APPROPRIATE REGULATORY INTEREST RATE ON $250 MILLION DEBT ISSED ON 11/25/08	**5.18%**	

$100 million issued on 9/1/09		
Interest rate reported by Company	5.00%	Dr. Morin's Schedule RAM-17
Adjustment:		
Adjustment to exclude impact of unregulated activities	0.27%	Interpretation of data shown from Merrill Lynch for 9/1/ 2009 as provided by Company in response to Staff-COC-5. Spread between A and BBB was about 0.80%. This was divided by 3 to get adjustment.
Interest rate on $250 million debt issuance		
APPROPRIATE REGULATORY INTEREST RATE ON $250 MILLION DEBT ISSED ON 11/25/08	**4.73%**	

INTEREST RATE ON 10-YEAR TREASURY BONDS

11/3/2008	2.71
11/4/2008	2.56
11/5/2008	2.5
11/6/2008	2.46
11/7/2008	2.56
11/10/2008	2.51
11/11/2008	
11/12/2008	2.37
11/13/2008	2.43
11/14/2008	2.33
11/17/2008	2.32
11/18/2008	2.22
11/19/2008	2.08
11/20/2008	1.94
11/21/2008	2.02
11/24/2008	2.24
11/25/2008	2.06
11/26/2008	2.01
11/27/2008	
11/28/2008	1.93
12/1/2008	1.71
12/2/2008	1.65
12/3/2008	1.6
12/4/2008	1.51
12/5/2008	1.67
12/8/2008	1.76
12/9/2008	1.61
12/10/2008	1.62
12/11/2008	1.55
12/12/2008	1.55
12/15/2008	1.5
12/16/2008	1.34
12/17/2008	1.35
12/18/2008	1.26
12/19/2008	1.35
12/22/2008	1.4
12/23/2008	1.53
12/24/2008	1.54
12/25/2008	
12/26/2008	1.51
12/29/2008	1.45
12/30/2008	1.47
12/31/2008	1.55
1/1/2009	
1/2/2009	1.72
1/5/2009	1.67

1/6/2009	1.68
1/7/2009	1.66
1/8/2009	1.6
1/9/2009	1.51
1/12/2009	1.45
1/13/2009	1.44
1/14/2009	1.36
1/15/2009	1.36
1/16/2009	1.47
1/19/2009	
1/20/2009	1.48
1/21/2009	1.6
1/22/2009	1.61
1/23/2009	1.64
1/26/2009	1.67
1/27/2009	1.59
1/28/2009	1.7
1/29/2009	1.87
1/30/2009	1.85
2/2/2009	1.75
2/3/2009	1.88
2/4/2009	1.91
2/5/2009	1.89
2/6/2009	1.97
2/9/2009	1.99
2/10/2009	1.79
2/11/2009	1.76
2/12/2009	1.73
2/13/2009	1.88
2/16/2009	
2/17/2009	1.65
2/18/2009	1.81
2/19/2009	1.89
2/20/2009	1.81
2/23/2009	1.84
2/24/2009	1.89
2/25/2009	2.06
2/26/2009	2.07
2/27/2009	1.99
3/2/2009	1.86
3/3/2009	1.87
3/4/2009	1.97
3/5/2009	1.82
3/6/2009	1.83
3/9/2009	1.9
3/10/2009	1.99
3/11/2009	1.96
3/12/2009	1.92
3/13/2009	1.87
3/16/2009	1.91
3/17/2009	2
3/18/2009	1.54
3/19/2009	1.64
3/20/2009	1.66
3/23/2009	1.69
3/24/2009	1.7
3/25/2009	1.84
3/26/2009	1.8
3/27/2009	1.79
3/30/2009	1.72
3/31/2009	1.67
AVERAGE FROM 1/1/09 THROUGH 3/31/09	1.76
ACTUAL ON 11/25/08	2.06
DIFFERENCE	**-0.30**
CHANGE IN SPREAD BETWEEN UTILITY BONDS AND TREASURY E [A]	**-0.25**
Estimated change in interest rate if Delmarva had Waited to issue $250 million of debt until first quarter of 2009	**-0.55**

Source: Downloaded from U.S. Federal Reserve website.

[A]

COMBINATION OF GAS & ELECTRIC UTILITIES
COMPANY WITNESS'S GROUP
DISCOUNTED CASH FLOW (DCF) INDICATED COST OF EQUITY

			BASED ON AVERAGE MARKET PRICE FOR Year Ending 12/31/09	BASED UPON MARKET PRICE AS OF 12/31/2009
1	Dividend Yield On Market Price	[B]	5.05%	4.39%
2	Retention Ratio:			
	a) Market-to-book	[B]	1.31	1.46
	b) Div. Yld on Book	[C]	6.62%	6.40%
	c) Return on Equity	[A]	11.00%	11.00%
	d) Retention Rate	[D]	39.85%	41.78%
3	Reinvestment Growth	[E]	4.38%	4.60%
4	New Financing Growth	[F]	0.31%	0.46%
5	Total Estimate of Investor Anticipated Growth	[G]	4.69%	5.05%
6	Increment to Dividend Yield for Growth to Next Year	[H]	0.12%	0.11%
7	Indicated Cost of Equity	[I]	9.86%	9.55%

Some of the Considerations for determining Future Expected Return on Equity:

			Median	Mean	Source:
[A]	Value Line Expectation		10.50%	11.24%	Schedule JAR 3, Page 2
	Return on Equity to Achieve Zacks' Growth		9.63%	10.48%	Schedule JAR 3, Page 3
	Earned Return on Equity in	2009	9.60%	10.71%	Schedule JAR 3, Page 2
	Earned Return on Equity in	2008	9.88%	10.80%	Schedule JAR 3, Page 2
	Earned Return on Equity in	2007	10.93%	11.05%	Schedule JAR 3, Page 2
[B]	Schedule JAR 3, Page 1				
[C]	Line 1 x Line 2a				
[D]	1- Line 2b/Line 2c				
[E]	Line 2c x Line 2d				
[F]	S X V				
	[M/B X (Ext. Fin Rate+1)/(M/B + Ext. Fin. Rate-1)		Ext. Fin. rate used =	1.00%	[J]
[G]	Line 3 + Line 4				
[H]	Line 1 x one-half of line 5				
[I]	Line 1 + Line 5 + Line 6				
[J]	SCHEDULE JAR 6, Page1				

S&P UTILITY INDEX ELECTRIC UTILITIES
COMPANY WITNESS'S GROUP
DISCOUNTED CASH FLOW (DCF) INDICATED COST OF EQUITY
All Companies in Index

			BASED ON AVERAGE MARKET PRICE FOR Year Ending 12/31/09	BASED UPON MARKET PRICE AS OF 12/31/2009
1	Dividend Yield On Market Price	[B]	5.29%	4.59%
2	Retention Ratio:			
	a) Market-to-book	[B]	1.39	1.52
	b) Div. Yld on Book	[C]	7.33%	7.00%
	c) Return on Equity	[A]	11.50%	11.50%
	d) Retention Rate	[D]	36.30%	39.14%
3	Reinvestment Growth	[E]	4.17%	4.50%
4	New Financing Growth	[F]	0.35%	0.47%
5	Total Estimate of Investor Anticipated Growth	[G]	4.52%	4.97%
6	Increment to Dividend Yield for Growth to Next Year	[H]	0.12%	0.11%
7	**Indicated Cost of Equity**	[I]	9.93%	9.68%

Some of the Considerations for determining Future Expected Return on Equity:

				Source:
		Median	Mean	
[A]	Value Line Expectation	11.75%	12.00%	Schedule JAR 3, Page 5
	Return on Equity to Achieve Zacks' Growth	10.99%	11.31%	Schedule JAR 3, Page 5
	Earned Return on Equity in 2009	10.47%	11.19%	Schedule JAR 3, Page 5
	Earned Return on Equity in 2008	12.47%	12.53%	Schedule JAR 3, Page 5
	Earned Return on Equity in 2007	12.08%	12.45%	Schedule JAR 3, Page 5
[B]	Schedule JAR 3, Page 4			
[C]	Line 1 x Line 2a			
[D]	1- Line 2b/Line 2c			
[E]	Line 2c x Line 2d			
[F]	S X V			
	[M/B X (Ext. Fin Rate+1)/(M/B + Ext. Fin. Rate-1)	Ext. Fin. rate used =		0.90% [J]
[G]	Line 3 + Line 4			
[H]	Line 1 x one-half of line 5			
[I]	Line 1 + Line 5 + Line 6			
[J]	SCHEDULE JAR 6, Page 2			

S&P UTILITY INDEX ELECTRIC UTILITIES
COMPANY WITNESS'S GROUP
DISCOUNTED CASH FLOW (DCF) INDICATED COST OF EQUITY
MORE THAN 50% OF REVENUES FROM REGULATED ACTIVITIES
Others Excluded

			BASED ON AVERAGE MARKET PRICE FOR Year Ending 12/31/09	BASED UPON MARKET PRICE AS OF 12/31/2009
1	Dividend Yield On Market Price	[B]	5.07%	4.51%
2	Retention Ratio:			
	a) Market-to-book	[B]	1.36	1.47
	b) Div. Yld on Book	[C]	6.91%	6.61%
	c) Return on Equity	[A]	11.50%	11.50%
	d) Retention Rate	[D]	39.90%	42.48%
3	Reinvestment Growth	[E]	4.59%	4.89%
4	New Financing Growth	[F]	0.33%	0.42%
5	Total Estimate of Investor Anticipated Growth	[G]	4.91%	5.31%
6	Increment to Dividend Yield for Growth to Next Year	[H]	0.12%	0.12%
7	Indicated Cost of Equity	[I]	10.11%	9.93%

Some of the Considerations for determining Future Expected Return on Equity:

			Median	Mean	Source:
[A]	Value Line Expectation		11.50%	11.60%	JAR SCHEDULE 3, Page 8
	Return on Equity to Achieve Zacks' Growth		10.76%	11.34%	JAR SCHEDULE 3, Page 8
	Earned Return on Equity in	2009	10.47%	11.22%	JAR SCHEDULE 3, Page 8
	Earned Return on Equity in	0	11.55%	12.14%	JAR SCHEDULE 3, Page 8
	Earned Return on Equity in	2007	11.51%	12.21%	JAR SCHEDULE 3, Page 8
[B]	JAR SCHEDULE 3, Page 7				
[C]	Line 1 x Line 2a				
[D]	1- Line 2b/Line 2c				
[E]	Line 2c x Line 2d				
[F]	S X V				
	[M/B X (Ext. Fin Rate+1)/(M/B + Ext. Fin. Rate-1)		Ext. Fin. rate used =	0.90%	[J]
[G]	Line 3 + Line 4				
[H]	Line 1 x one-half of line 5				
[I]	Line 1 + Line 5 + Line 6				
[J]	SCHEDULE JAR 6, Page 3				

EXTERNAL FINANCING RATE
(Millions of Shares)

COMBINATION OF GAS & ELECTRIC UTILITIES WITNESS MORIN'S GROUP	Common Stock Outstanding 2009	 20012-14	Compound Annual
ALLETE	35.00	42.00	4.66%
Alliant Energy	111.00	116.00	1.11%
Ameren Corp	238.00	252.00	1.44%
CMS Energy Corp.	230.00	238.00	0.86%
Consol. Edison	277.00	285.00	0.71%
DTE Energy	166.00	178.00	1.76%
Duke Energy	1305.00	1315.00	0.19%
Empire Dist. Elec.	38.00	42.00	2.53%
Entergy Corp.	189.00	180.00	-1.21%
Exelon Corp.	660.00	635.00	-0.96%
MGE Energy	23.20	25.00	1.89%
Northeast Utilities	176.00	188.00	1.66%
North Western Crop			
NSTAR	106.81	106.81	0.00%
NV Energy Inc.	235.00	250.00	1.56%
PG&E Corp.	369.00	400.00	2.04%
Public Serv. Enterprise	506.00	490.00	-0.80%
TECO Energy	214.00	218.00	0.46%
UniSource Energy	35.80	37.50	1.17%
Wisconsin Energy	117.00	117.00	0.00%
Xcel Energy Inc.	456.00	464.00	0.44%
Avista Corp.	55.00	58.50	1.55%

Source: Value Line issues: 11/27/09, 12/25/09, 11/6/09.

Average	1.00%
Median	1.11%
Round to	**1.00%**

S&P UTILITY INDEX ELECTRIC UTILITIES WITNESS MORIN'S GROUP	Common Stock Outstanding 2009	 20012-14	Compound Annual
Allegheny Energy	170.00	174.00	0.58%
Ameren Corp	238.00	252.00	1.44%
CMS Energy Corp.	230.00	238.00	0.86%
CenterPoint Energy	394.00	420.00	1.61%
Consol. Edison	277.00	285.00	0.71%
DTE Energy	166.00	178.00	1.76%
Dominion Resources	598.00	623.00	1.03%
Duke Energy	1305.00	1315.00	0.19%
Edison Int"l	325.81	325.81	0.00%
Entergy Corp.	189.00	180.00	-1.21%
Exelon Corp.	660.00	635.00	-0.96%
FPL Group	415.00	438.00	1.36%
FirstEnergy Corp.	304.84	304.84	0.00%
Integrys Energy	77.50	82.00	1.42%
NiSource Inc.	275.50	279.00	0.32%
PG&E Corp.	369.00	400.00	2.04%
PPL Corp.	377.00	370.00	-0.47%
Pepco Holdings	223.00	265.00	4.41%
Pinnacle West Capital	101.50	118.00	3.84%
Progress Energy	280.00	288.00	0.71%
Public Serv. Enterprise	506.00	490.00	-0.80%
Sempra Energy	246.00	250.00	0.40%
Southern Co.	796.00	823.00	0.84%
TECO Energy	214.00	218.00	0.46%
Wisconsin Energy	117.00	117.00	0.00%
Xcel Energy Inc.	456.00	464.00	0.44%

Source: Value Line issues: 11/27/09, 12/25/09, 11/6/09.

Average	0.81%
Median	0.64%
Round to	**0.90%**

S&P UTILITY INDEX ELECTRIC UTILITIES
MORE THAN 50% OF REVENUES FROM REGULATED ACTIVITIES
WITNESS MORIN'S GROUP

1	Allegheny Energy	170.00	174.00	0.58%
	Ameren Corp	238.00	252.00	1.44%
	CMS Energy Corp.	230.00	238.00	0.86%
	Consol. Edison	277.00	285.00	0.71%
	DTE Energy	166.00	178.00	1.76%
	Duke Energy	1305.00	1315.00	0.19%
	Edison Int"l	325.81	325.81	0.00%
	Entergy Corp.	189.00	180.00	-1.21%
	Exelon Corp.	660.00	635.00	-0.96%
	FPL Group	415.00	438.00	1.36%
	FirstEnergy Corp.	304.84	304.84	0.00%
	PG&E Corp.	369.00	400.00	2.04%
	Pepco Holdings	223.00	265.00	4.41%
	Pinnacle West Capital	101.50	118.00	3.84%
	Progress Energy	280.00	288.00	0.71%
	Public Serv. Enterprise	506.00	490.00	-0.80%
	Southern Co.	796.00	823.00	0.84%
	TECO Energy	214.00	218.00	0.46%
	Wisconsin Energy	117.00	117.00	0.00%
	Xcel Energy Inc.	456.00	464.00	0.44%

Source: Value Line issues: 11/27/09, 12/25/09, 11/6/09.

Average	0.83%
Median	0.64%
Round to	**0.90%**

COMBINATION OF GAS & ELECTRIC UTILITIES
WITNESS MORIN'S GROUP

	% Common Equity w/out Short Term Debt				VL Est.	($000,000s)	Quantity					Percentage			
	2005	2006	2007	2008	2009	Total Debt	LT Debt	ST Debt	Pfd Stock	Equity	Total Capital	LT Debt	ST Debt	Pfd Stock	Equity Ratio With ST Debt
ALLETE	60.9%	64.9%	64.4%	58.4%	55.5%	$ 645.7	$ 628.4	$ 17.3	$ -	$ 783.7	$ 1,429.4	44.0%	1.2%	0.0%	54.8%
Alliant Energy	53.1%	62.9%	61.9%	58.6%	55.5%	$ 2,427.4	$ 2,155.9	$ 271.5	$ 243.8	$ 2,992.9	$ 5,664.1	38.1%	4.8%	4.3%	52.8%
Ameren Corp	53.3%	54.6%	53.4%	50.8%	51.0%	$ 7,884.0	$ 7,321.0	$ 563.0	$ 195.0	$ 7,822.8	$ 15,901.8	46.0%	3.5%	1.2%	49.2%
CMS Energy Corp.	23.4%	24.9%	25.9%	27.4%	28.5%	$ 10,130.0	$ 9,507.0	$ 623.0	$ 287.0	$ 3,903.9	$ 14,320.9	66.4%	4.4%	2.0%	27.3%
Consol. Edison	49.0%	48.5%	53.1%	51.2%	51.0%	$ 10,773.0	$ 9,376.0	$1,397.0	$ 212.6	$ 9,980.0	$ 20,965.6	44.7%	6.7%	1.0%	47.6%
DTE Energy	44.9%	43.9%	45.6%	43.6%	44.0%	$ 8,249.0	$ 7,874.0	$ 375.0	$ -	$ 6,186.7	$ 14,435.7	54.5%	2.6%	0.0%	42.9%
Duke Energy		59.0%	69.1%	61.3%	59.0%	$ 16,428.0	$15,406.0	$1,022.0	$ -	$ 22,169.6	$ 38,597.6	39.9%	2.6%	0.0%	57.4%
Empire Dist. Elec.	49.0%	50.3%	49.9%	46.4%	45.5%	$ 751.7	$ 637.1	$ 114.6	$ -	$ 531.9	$ 1,283.6	49.6%	8.9%	0.0%	41.4%
Entergy Corp.	45.5%	46.7%	43.9%	40.2%	40.0%	$ 11,522.0	$10,346.0	$1,176.0	$ 309.2	$ 7,103.5	$ 18,934.7	54.6%	6.2%	1.6%	37.5%
Exelon Corp.	43.5%	45.4%	45.7%	46.6%	52.0%	$ 13,015.0	$11,411.0	$1,604.0	$ 87.0	$ 12,456.2	$ 25,558.2	44.6%	6.3%	0.3%	48.7%
MGE Energy	60.7%	61.3%	64.8%	63.7%	64.0%	$ 372.5	$ 272.5	$ 100.0	$ -	$ 484.4	$ 856.9	31.8%	11.7%	0.0%	56.5%
Northeast Utilities	35.1%	39.7%	39.2%	38.1%	40.0%	$ 5,536.0	$ 4,909.4	$ 626.6	$ 116.2	$ 3,350.4	$ 9,002.6	54.5%	7.0%	1.3%	37.2%
North Western Corp.								$ -		$ -	$ -				
NSTAR	38.6%	39.7%	40.1%	42.8%	52.5%	$ 2,964.5	$ 1,741.3	$1,223.2	$ 43.0	$ 1,972.1	$ 4,979.6	35.0%	24.6%	0.9%	39.6%
NV Energy Inc.	34.8%	39.6%	42.0%	37.3%	36.5%	$ 5,580.9	$ 5,571.6	$ -	$ -	$ 3,202.7	$ 8,774.5	63.5%	0.0%	0.0%	36.5%
PG&E Corp.	50.0%	46.8%	46.1%	46.5%	48.0%	$ 12,337.0	$10,964.0	$1,373.0	$ 258.0	$ 10,358.8	$ 22,953.8	47.8%	6.0%	1.1%	45.1%
Public Serv. Enterprise	34.6%	39.2%	45.5%	49.0%	49.0%	$ 8,457.0	$ 7,566.0	$ 891.0	$ 80.0	$ 7,346.2	$ 15,883.2	47.6%	5.6%	0.5%	46.3%
TECO Energy	30.0%	35.0%	39.0%	38.5%	39.0%	$ 3,369.6	$ 3,201.7	$ 167.9	$ -	$ 2,047.0	$ 5,416.6	59.1%	3.1%	0.0%	37.8%
UniSource Energy	24.7%	27.1%	31.2%	27.1%	29.5%	$ 1,827.2	$ 1,821.2	$ -	$ -	$ 762.1	$ 2,583.3	70.5%	0.0%	0.0%	29.5%
Wisconsin Energy	46.7%	48.2%	49.2%	44.8%	46.0%	$ 4,881.7	$ 3,631.2	$1,250.5	$ 30.4	$ 3,119.1	$ 8,031.2	45.2%	15.6%	0.4%	38.8%
Xcel Energy Inc.	47.3%	47.0%	49.4%	47.1%	47.5%	$ 8,884.4	$ 8,055.6	$ 828.8	$ 105.0	$ 7,383.4	$ 16,372.8	49.2%	5.1%	0.6%	45.1%
Avista Corp.	40.6%	46.3%	59.0%	51.9%	48.0%	$ 1,142.2	$ 861.7	$ 280.5	$ -	$ 795.4	$ 1,937.6	44.5%	14.5%	0.0%	41.1%
Average	43.3%	46.2%	48.5%	46.3%	46.8%	$ 137,179	$ 123,259	$13,905	$ 1,967	$ 114,753	$ 253,884	49.11%	6.68%	0.73%	43.49%
											Median	47.64%	5.61%	0.38%	42.86%

Source: Most current Value Line at time of prep.

DELMARVA CAPITAL STRUCTURE

		Proforma Amount Requested by Company [A]	Adjustment	Recommended Amount
AMOUNT				
	Short-term Debt	$0	$84,187,130 [B]	$84,187,130
	Long-term Debt	$883,699,338	($44,184,967) [C]	$839,514,371
	Common Equity	$800,043,265	($40,002,163) [D]	$760,041,102
	TOTAL	$1,683,742,603		$1,683,742,603
PERCENT				
	Short-term Debt	0.00%		5.00%
	Long-term Debt	52.48%		49.86%
	Common Equity	47.52%		45.14%
	TOTAL	100.00%		100.00%

Source

[A] Company witness Dr. Morin's Schedule RAM-15

[B] Per Schedule JAR 7, Page 1
the comparative group average capital struture contains 6.68% short-term debt. This could be viewed as atypically high because of the impact of a few companies. The median percentage is 5.61% .
By using the median as a starting point, the influence of the outliers offset.
I lowered the amount of short-term debt to 5.00% to provide an allowance for construction projects earning interest. Per the response to PSC-COC-63, the CWIP balance earning interest for Delmarva was $4.6 million. This $4.6 million represents 0.3% of capital structure. Therefore, lowering the ST debt percentage to 5.00% more than compensates for CWIP earning AFUDC.

[C] Short-term debt amount multiplied by the percentage of long-term debt in the capital structure without short-term debt.

[D] Short-term debt amount multiplied by the percentage of common equity in the capital structure without short-term debt.

CAPM SUMMARY OF RESULTS

		Results as of 12/31/2009	
1	Market Based CAPM	9.22%	[A]
2	Traditional CAPM	9.02%	[B]
3	Average (Market Based and Traditional)	9.12%	[C]

Source:

[A] Schedule JAR 8, Page 4
[B] Schedule JAR 8, Page 3
[C] Average of Line 1 and 2

ADJUSTMENT TO CAPM TO MAKE RESULT APPLICABLE TO CURRENT FINANCIAL MARKET

1	**PREMIUM TO ACCOUNT FOR GREAT RECESSION**				
a.	Recent Spread of BB Corp Bond Yield Over 20-Year US Treasury Bonds	5.20% [A]			
b.	Average Spread of BB Corp Bond over 20-year US Treasuries Over 8 Year Period Ending November 2008	3.40% [A]			
c.	Premium to Account for Great Recession				1.80%
2	**ADJUSTMENT FOR CURRENT INTEREST RATE ENVIRONMENT**				
	Current Risk Free Rate Based on Historical Normalized Interest Rate Adjusted for Inflation Expectations:				
a.	Interest Rate on 30-Year Treasury Bonds	4.63% [B]			
b.	Interest Rate on Long-Term Inflation Indexed Treasury Bonds	2.03% [B]			
c.	Current Market Inflation Expectation		2.60% [C]		
d.	Historical Actual Inflation		3.00% [D]		
e.	Current Risk Free Rate Based on Historical Normalized Interest Rate Adjusted for Inflation Expectations			-0.40%	
	Current Risk Free Rate Based on Normal Difference Between LT and ST treasuries:				
f.	Current Yield of 30-Year US Treasury Bonds		4.63% [B]		
g.	Average Return on Long-Term U.S. Treasury Bonds From 1926 to 2008	5.70% [E]			
h.	Average Return on Short-Term U.S. Treasury Bills from 1926 to 2008	3.70% [F]			
i.	Average Maturity Premium		2.00%		
j.	Current Risk Free Rate Based on Normal Difference Between LT and ST treasuries		2.63%		
k.	Historical Risk Free rate		3.70% [F]		
l.	Current Risk Free Rate Based on Normal Difference Between LT and ST treasuries:			-1.07%	
m.	**Adjustment for Current Interest Rate Environment**				-0.74% [G]
3	**TOTAL ADJUSTMENT TO CAPM METHODS TO MAKE RESULT APPLICABLE TO CURRENT FINANCIAL MARKET**				1.07% [H]

Staff-COC-5 Attachment 1
Staff-COC-5 Attachment 1

Sources:
[A] Staff-COC-5 Attachment 1
[A] Staff-COC-5 Attachment 1
[B] Federal Reserve Statistical Release, 12/31/09
[B] Federal Reserve Statistical Release, 12/31/09
[C] Line 2a - Line 2b
[D] Ibbotson "SBBI" 2009 Classic Yearbook, page 275
[E] Ibbotson "SBBI" 2009 Classic Yearbook, page 257
[F] Ibbotson "SBBI" 2009 Classic Yearbook, page 269
[G] Average of Adjustment for Inflation and Adjustment for Difference Between LT and ST Treasuries
[H] Premium to Account for Great Recession - Adjustment for Current Interest Rate Environment

COMBINATION OF GAS & ELECTRIC UTILITIES

TRADITIONAL CAPM
BASED ON HISTORICAL ACTUAL COMPOUND ANNUAL RETURNS
FROM 1926-2008 AND ADJUSTED FOR MARKET CONDITIONS AS OF
12/31/2009

1	Historical Actual Return on Large Company Stocks from 1926-2008	9.6%	[A]
2	Average Return on Short-Term U.S. Treasury Bills	3.7%	[A]
3	Risk Prium	5.90%	Line 1 x Line 2
4	Beta of Company Witness Group	0.72	[B]
5	Risk Prium Based on Comparative Group	4.26%	Line 3 X Line 4
6	Average Return on Short-Term U.S. Treasury Bills	3.70%	[A]
7	Adjustment to Make Resuts Applicable to Current Market	1.07%	[C]
7	Indicated Cost of Equity for Portfolio of Companies with a beta of 0.72	9.02%	

Sources:
[A] *Ibbotson SBBI 2009 Classic Yearbook*, page 32
[B] Schedule JAR 3, Page 3
[C] Schedule JAR 8, Page 2

MARKET BASED CAPM

HISTORIC ACTUAL COMPOUND RETURNS FROM 1926-2008
BY BETA

	Portfolio by Size Decile	1	2	3	4	5	6	7	8	9	10
[A]	Beta	0.91%	1.03%	1.10%	1.12%	1.16%	1.18%	1.24%	1.30%	1.35%	1.41%
[B]	Historic Actual Compounded Annual Return	8.90%	10.10%	10.40%	10.40%	10.90%	10.90%	10.80%	11.00%	11.10%	12.50%

[D] Least Squared Line Derived from compouned annual returns returns per decile

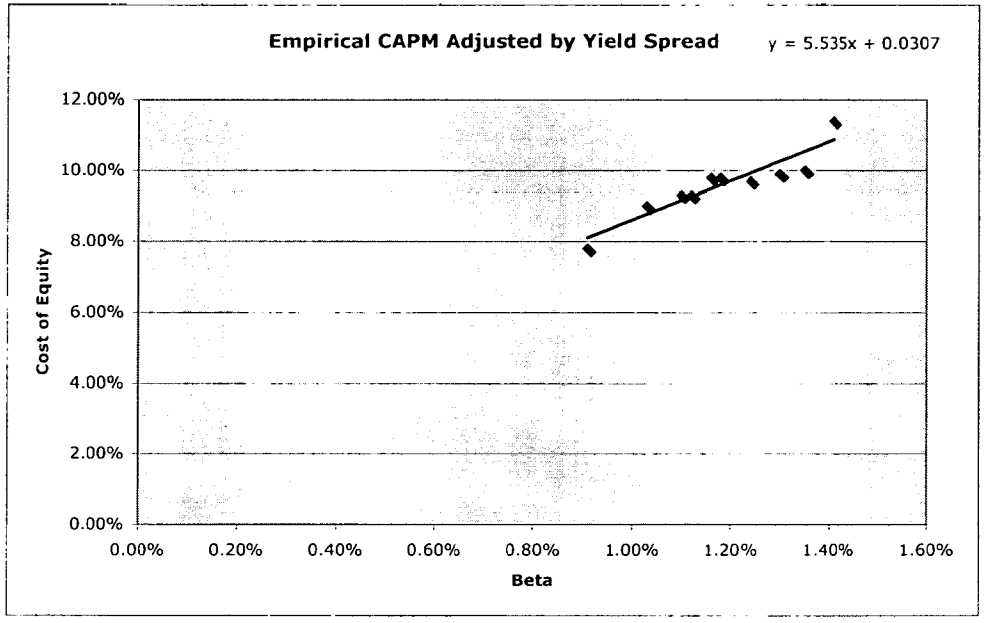
Beta	Slope	Y-Intercept	Return
1	5.53	4.17	9.70%

Least Squared Line

	Beta	Slope	Y-Intercept	Return
[D]	0.72	5.53	4.17	8.15%

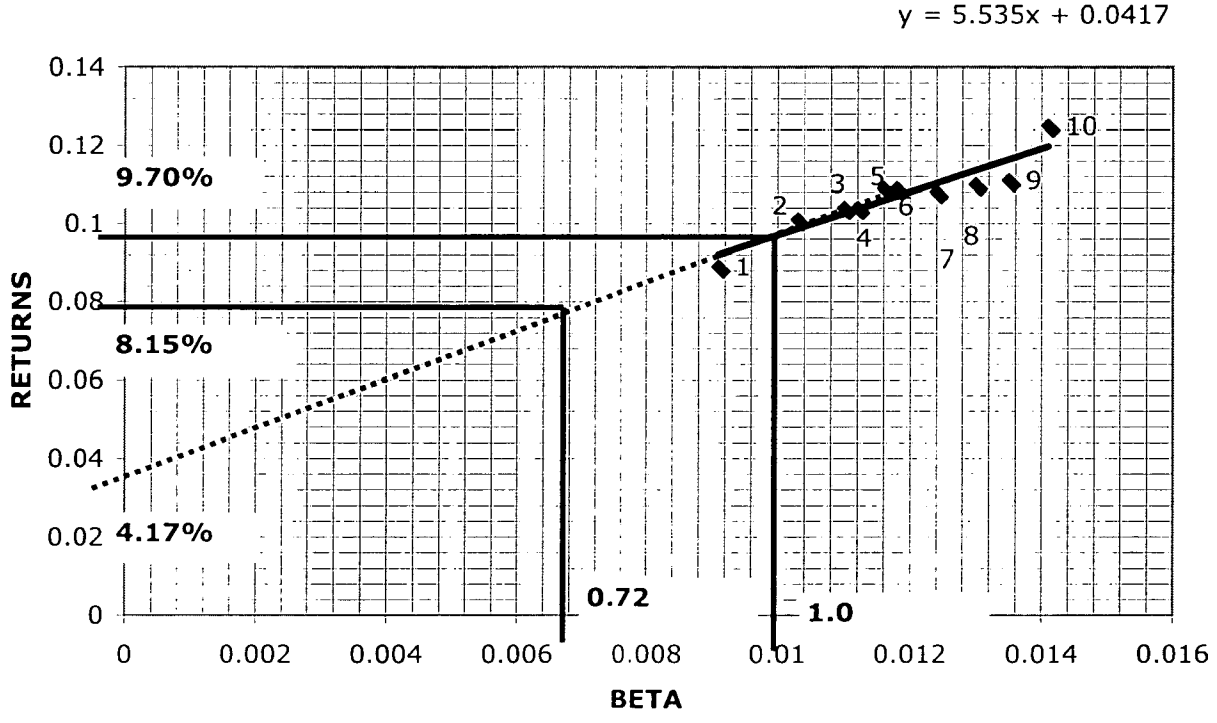
Historical Return for Companies with Beta of	0.72		8.15%
			1.07%
			9.22%

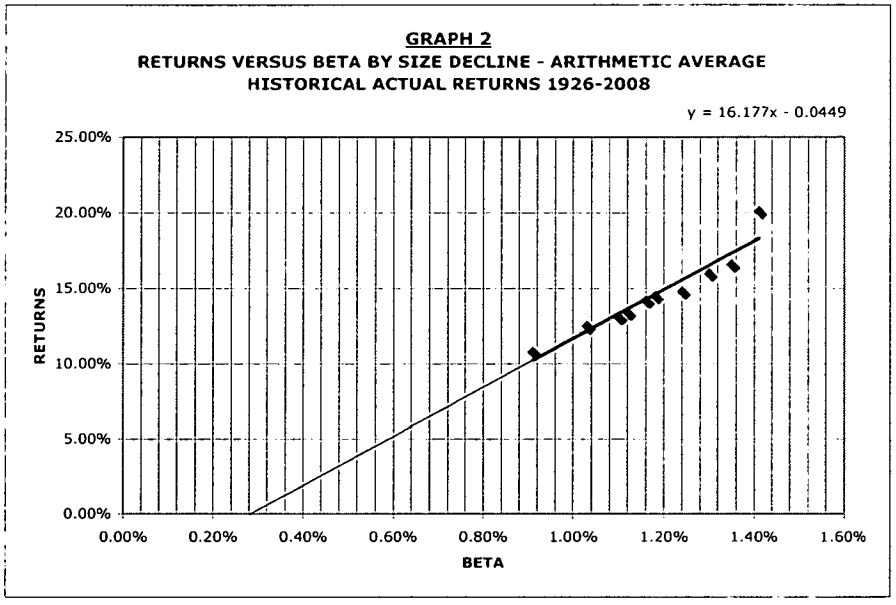
Sources:
[A] Ibbotson Associates 2009 Yearbook, page 115
[B] Ibbotson Associates 2009 Yearbook, page 106
[C] by 0.40% actual difference between 3.00% historical and 2.60% current expected long-term inflation rate.
[D] Trend Line Equation. See JAR Schedule 8, Page 6


Empirical CAPM Adjusted by Yield Spread
y = 5.535x + 0.0307
12.00%
10.00%
8.00%
6.00%
4.00%
2.00%
0.00%
Cost of Equity
0.00%
0.20%
0.40%
0.60%
0.80%
1.00%
1.20%
1.40%
1.60%
Beta

GRAPH 1

RETURNS VERSUS BETA - COMPOUND ANNUAL
HISTORICAL ACTUAL RETURNS 1926-2008
HISTORIC ACTUAL INFLATION 1926-2008: 3.0%




GRAPH 2
RETURNS VERSUS BETA BY SIZE DECLINE - ARITHMETIC AVERAGE
HISTORICAL ACTUAL RETURNS 1926-2008
y = 16.177x - 0.0449
25.00%
20.00%
15.00%
10.00%
5.00%
0.00%
RETURNS
0.00%
0.20%
0.40%
0.60%
0.80%
1.00%
1.20%
1.40%
1.60%
BETA

[A]	Portfolio by Size Decile	1	2	3	4	5	6	7	8	9	10
[A]	Beta	0.91%	1.03%	1.10%	1.12%	1.16%	1.18%	1.24%	1.30%	1.35%	1.41%
[B]	Historic Arithmetic Mean Return	10.80%	12.50%	13.10%	13.40%	14.20%	14.50%	14.80%	16.00%	16.60%	20.10%

Sources:

[A] Ibbotson Associates 2009 Yearbook, page 125

[B] Ibbotson Associates 2009 Yearbook, page 106

testifying experience